C21.5:959/1

Vol. 959 Number 1

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

June 7, 1977

U.S.
DEPARTMENT
OF COMMERCE

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and
Trademark
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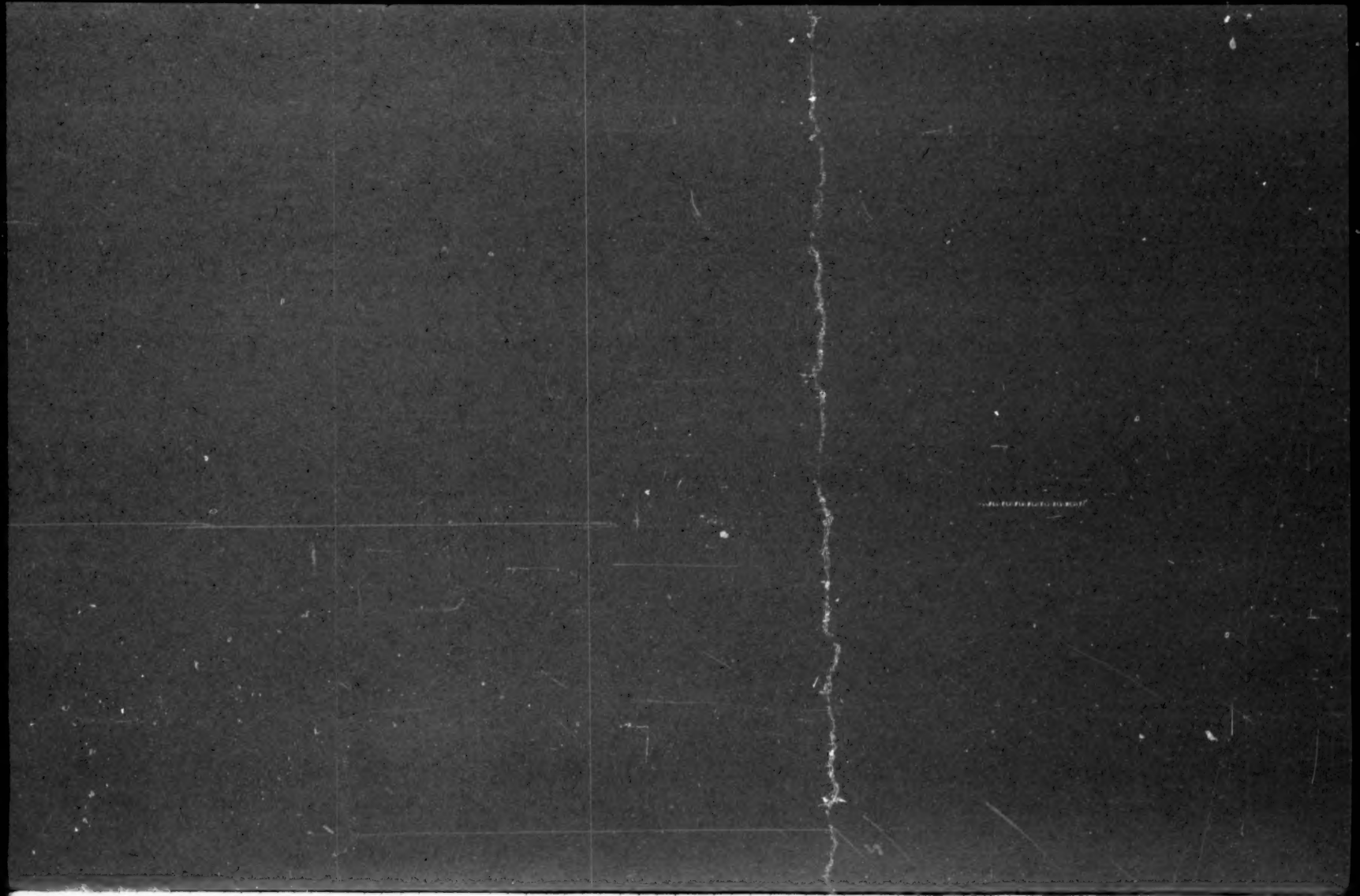

OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

June 7, 1977 Volume 959 Number 1

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PATENT AND TRADEMARK OFFICE NOTICES

Addition of U.S. Classification to the List of Patentees Indices

In the past the List of Patentees Index in the OFFICIAL GAZETTE and the Annual Index of Patents listed the U.S. patent classification by class and subclass following the name of only the first or sole patentee.

Effective with the July 5, 1977 issue of the patent OFFICIAL GAZETTE and the 1977 Annual Index of Patents, the U.S. classification information will also appear following the name of all joint patentees.

RICHARD J. SHAKMAN,

May 17, 1977. *Assistant Commissioner for Administration.*

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,919,990, Podlesak, Kraft and Miller, METHOD OF CONTINUOUSLY PRODUCING PACKAGED UNITS, **filed** June 13, 1974, D.C., N.D. Ill. (Chicago) Doc. 74c1624, *Kraftco Corporation* v. *Falbo Cheese Company.* Cause dismissed with prejudice and without costs pursuant to stipulation of parties, July 2, 1975.

2,972,349, R. A. DeWall, CAPILLARY OXEGENATOR; **3,228,876,** H. I. Mahon, PERMEABILITY SEPARATORY APPARATUS, PERMEABILITY SEPARATORY MEMBRANE ELEMENT, METHOD OF MAKING THE SAME AND PROCESS UTILIZING THE SAME; **3,546,209,** B. J. Lipps, Jr. PROCESS FOR THE FABRICATION OF A CELLULOSE HOLLOW FIBER SEPARATORY CELL, **filed** Mar. 6, 1975, D.C. Del. (Wilmington) Doc. 75–67, *Cobe Laboratories, Inc. and Abcor, Inc.* v. *The Dow Chemical Co., Cordis Dow Corp. and The Regents of the University of Minnesota.* It is hereby stipulated by counsel for parties that the portion of the complaint for declaratory judgment herein shall be dismissed without prejudice, Jan. 21, 1977.

3,047,196, Levine and Phillips, GARMENT HANGER, **filed** November 1976, D.C., S.D.N.Y., Doc. 76–C–5241DBB, *A & E Warbern Inc.* v. *Cartier Industries.*

3,055,988, B. B. Bauer, MAGNETIC PHONOGRAPH PICKUP; **3,077,521,** Ahrens, Kuhn and Richter, STEREOPHONIC MOVING MAGNET PHONOGRAPH PICKUP; **3,077,522,** Gunter and Anderson, STEREOPHONIC PICKUP CARTRIDGE, **filed** May 10, 1976, D.C. Colo. (Denver) Doc. 76–0493, *Shure Brothers Inc.* v. *Music Discount.* Consent judgment, defendant is restrained from further infringement upon above patents, entered Aug. 16, 1976.

3,063,457, Bittner and Gnass, FOOT EXERCISER SANDALS, **filed** Aug. 14, 1974, D.C., N.D. Ill. (Chicago) Doc. 74c2302, *Scholl, Inc.* v. *S. S. Kresge Company.* Judgment, the counterclaim of the defendant is hereby denied and dismissed. The Court enters final judgment in favor of the plaintiff and against the defendant on the question of liability. Defendant is enjoined from directly or indirectly infringing said patent, Jan. 20, 1977. **Same, filed** Feb. 26, 1975, D.C., N.D. Ill. (Chicago) Doc. 75c622, *Scholl, Inc.* v. *Modern Shoe Co. and Glory Products Trading Co. Ltd.* Judgment, final judgment is in favor of the plaintiff and against the defendant on the question of liability. Defendant is enjoined and restrained from directly or indirectly infringing said patent, Jan. 20, 1977.

3,077,521. (See 3,055,988.)

3,077,522. (See 3,055,988.)

3,078,471, L. H. Knibb, LIQUID DISPENSING APPARATUS; **3,190,502,** same, APPARATUS FOR DISPENSING LIQUID SHAMPOO; **3,322,349,** same, APPARATUS AND SYSTEM FOR DISPENSING HAIR PREPARATIONS; **3,386,664,** same, BOTTLE CLOSURE ASSEMBLY FOR AN ATOMIZER; **3,491,951,** same, ATOMIZING HEAD AND BOTTLE COMBINATION FOR A LIQUID HAIR SPRAY OR THE LIKE, **filed** Sept. 22, 1976, D.C., N.D. Calif. (San Francisco) Doc. C76–2041–RFP, *Leroy H. Knibb, Sr.* v. *Revlon Co. Inc. et al.*

3,190,502. (See 3,078,471.)

3,228,876. (See 2,972,349.)

3,322,349. (See 3,078,471.)

3,328,676, S. I. Slater, CONTINUOUSLY VARIABLE DIMMER SWITCH; **Re. 26,119,** Same; **Re. 26,267,** B. H. Matthews, ELECTRICAL SWITCH WITH CAMMING BRIDGING CONTACT, **filed** July 11, 1968, D.C., N.D. Ill. (Chicago), Doc. 68c1290, *Skil Corporation* v. *Lucerne Products Inc.* Cause transferred to the District Court for the Northern District of Ohio, Sept. 24, 1970.

3,346,391, Miller and Flodin, PROCESS OF REMOVING AND RECOVERING OIL FROM DEEP-FRIED PRODUCTS, **filed** Sept. 9, 1976, D.C., E.D. Wash. (Spokane) Doc. C76–245, *Agri-Temp, Inc.* v. *Twin City Foods.*

3,386,664. (See 3,078,471.)

3,475,234, Kerwin, Klein, and Sarace, METHOD FOR MAKING MIS STRUCTURES; **3,544,390,** H. G. Dill, INSULATED GATE FIELD-EFFECT TRANSITION (IGFET) WITH SEMICONDUCTOR GATE ELECTRODE; **3,576,478,** Watkins and Selser, IGFET COMPRISING N-TYPE SILICON SUBSTRATE, SILICON OXIDE GATE INSULATOR AND P-TYPE POLYCRYSTALLINE SILICON GATE ELECTRODE, **filed** Nov. 11, 1974, D.C. Del. (Wilmington) Doc. 74–238, *Bell Telephone Laboratories, Inc.* v. *Hughes Aircraft Company and General Instrument Corporation.* Final judgment, judgment on priority of invention pursuant to 35 U.S.C. 291, Nov. 16, 1976.

3,491,951. (See 3,078,471.)

3,544,390. (See 3,475,234.)

3,546,209. (See 3,972,349.)

3,576,478. (See 3,475,234.)

3,659,284, W. T. Rusch, TELEVISION GAMING APPARATUS; **3,659,285,** R. H. Baer, TELEVISION GAMING APPARATUS AND METHOD; **3,708,480,** same, TELEVISION GAMING AND TRAINING APPARATUS; **Re. 28,507,** W. T. Rusch, TELEVISION GAMING APPARATUS; **Re. 28,598,** same, **filed** Dec. 9, 1976, D.C., S.D. Fla. (Fort Lauderdale) Doc. 76–2221–C–NCR, *The Magnavox Company and Sanders Associates, Inc.* v. *Allied Leisure Industries and Tandy Corporation.*

3,659,285. (See 3,659,284.)

3,708,967, Geist and Ballas, ROTARY CUTTING ASSEMBLY; **3,826,068,** same; **3,859,776,** same, **filed** July 16, 1976, D.C., N.D. Tex. (Fort Worth) Doc. CA4–76–201, *K & S Industries, Inc.* v. *Weed Eater, Inc.*

3,728,480. (See 3,659,284.)

3,749,974, W. R. Kissel, ELECTRONIC IGNITION CONTROLLER, **filed** Mar. 24, 1975, D.C. Kans. (Wichita) Doc. 75–64–C6, *Chrysler Corporation* v. *Automotive Controls Corp. and The Echlin Manufacturing Co., Inc.*

3,826,068, Ballas and Geist, ROTARY CUTTING ASSEMBLY; **3,859,776,** same, **filed** July 9, 1976, D.C., S.D. Tex. (Houston) Doc. 76–H–1159, *Weed Eater, Inc.* v. *K & S Mfg. Co. et al.* **Same, filed** July 11, 1975, D.C. Kans. (Kansas City) Doc. 75–146–C2, *Weed Eater, Inc.* v. *Allied Industries of Kansas, Inc.*

3,826,068. (See 3,708,967.)

3,859,776. (See 3,708,967.)

3,859,776. (See 3,826,068.)

Re. 26,119. (See 3,328,676.)

Re. 26,267. (See 3,328,676.)

Re. 28,507. (See 3,659,284.)

Re. 28,598. (See 3,659,284.)

PATENT NOTICES

Certificates of Correction for the Week of June 7, 1977

D. 241,577	3,980,889	3,999,054	4,011,291
D. 242,221	3,981,652	3,999,379	4,011,577
3,583,984	3,981,842	3,999,723	4,011,839
3,615,931	3,982,687	3,999,846	4,011,841
3,703,334	3,983,084	4,000,023	4,011,862
3,766,386	3,983,539	4,000,336	4,011,952
3,793,223	3,984,215	4,002,748	4,012,111
3,800,483	3,984,408	4,002,752	4,012,112
3,809,043	3,984,438	4,003,163	4,012,332
3,849,895	3,985,231	4,003,423	4,012,441
3,860,849	3,985,433	4,003,514	4,012,483
3,862,351	3,985,811	4,003,715	4,012,525
3,866,086	3,985,821	4,003,937	4,012,566
3,883,946	3,987,324	4,004,242	4,012,593
3,886,072	3,987,705	4,004,685	4,012,670
3,920,359	3,988,606	4,005,373	4,012,887
3,922,468	3,989,009	4,005,921	4,013,160
3,931,573	3,990,062	4,006,076	4,013,293
3,932,725	3,990,274	4,006,319	4,013,526
3,934,696	3,990,297	4,006,324	4,013,527
3,938,748	3,990,727	4,007,299	4,013,570
3,940,473	3,991,073	4,007,407	4,014,495
3,947,709	3,991,094	4,007,547	4,014,870
3,949,476	3,992,198	4,008,265	4,015,011
3,956,872	3,992,402	4,008,646	4,015,032
3,958,153	3,992,480	4,008,690	4,015,388
3,958,246	3,993,426	4,008,791	4,015,537
3,963,001	3,994,553	4,008,980	4,015,869
3,963,651	3,995,003	4,009,024	4,015,968
3,967,393	3,997,198	4,009,208	4,016,287
3,968,829	3,997,360	4,009,258	4,016,400
3,975,191	3,997,549	4,009,439	4,016,492
9,976,527	3,997,875	4,009,550	4,016,528
3,976,722	3,997,890	4,009,745	4,016,969
3,976,758	3,997,956	4,010,021	4,019,952
3,976,929	3,998,197	4,010,563	
3,979,461	3,998,204	4,010,709	
3,979,594	3,998,712	4,011,011	

Disclaimers

Design No. 215,259.—*Martelle J. Syverson,* Albert Lea, Minn. BEVERAGE DISPENSER. Patent dated Sept. 16, 1969. Disclaimer filed Feb. 17, 1977, by the assignee, *Fountain Industries, Inc.*

Hereby enters this disclaimer to the sole claim of said patent.

3,801,530.—*William T. Free,* Madison, N.J. STABILIZED POLYALKYLENE RESIN COMPOSITION AND PROCESS FOR MAKING SAME. Patent dated Apr. 2, 1974. Disclaimer filed Apr. 6, 1977, by the assignee, *Celanese Corporation.*

Hereby enters this disclaimer to claims 1 through 30 inclusive of said patent.

Dedications

3,686,623.—*John P. Nijman,* Scarborough, Ontario, Canada. COAXIAL CABLE CONNECTOR PLUG. Patent dated Aug. 22, 1972. Dedication filed Mar. 14, 1977, by the assignee, *Bunker Ramo Corporation.*

Hereby dedicates to the Public the entire term of said patent.

3,865,082.—*David D. Lovitz,* Short Hills, N.J., and *Ness Eastman,* Rego Park, and *William H. Davidson,* Katonah, N.Y. SMALL ANIMAL PLAYGROUND. Patent dated Feb. 11, 1975. Dedication filed Mar. 14, 1977, by the assignee, *The Hartz Mountain Corporation.*

Hereby dedicates to the Public the entire term of said patent.

3,872,685.—*Alan A. Matthies,* Milwaukee, Wis. EVAPORATOR TEMPERATURE CONTROL FOR REFRIGERATION SYSTEMS. Patent dated Mar. 25, 1975. Dedication filed Apr. 13, 1977, by the assignee, *The Singer Company.*

Hereby dedicates to the Public the entire term of said patent.

Disclaimer and Dedication

3,786,678.—*Peter Kunz,* Meilen, Switzerland. FORCE MEASURING APPARATUS INCLUDING ELECTROMAGNETIC LOAD COMPENSATION. Patent dated Jan. 22, 1974. Disclaimer filed Apr. 13, 1977, by the assignee, *Mettler Instrumente AG.*

Hereby disclaims and dedicates to the Public claims 1–10 of said patent.

Use of Certificate of Correction Forms

The purpose of this notice is, to once again, remind patentees and their attorneys and agents to submit the text of any correction under 37 CFR 1.322 and 1.323 on the Certificate of Correction form, PTO–1050, which is available free of charge from the Patent and Trademark Office. The presentation of all corrections on this form permits its use as camera copy for prompt, direct offset printing of the Certificate of Correction.

Instructions for use of form PTO–1050 are printed on the top portion thereof, and are also set forth, in further detail, in Section 1402.02 of the Manual of Patent Examining Procedures. It is especially important that the typing be clean and clear. Both thin, light type and heavy, smudged type should be avoided. Changes and corrections are preferably made by use of white opaque correction fluid.

The typing should be within the borders printed on the form and a two-inch blank space should be left at the bottom of the last page of the form for the placement of the signature of the Attesting Officer.

Both sheets of the printed form should be forwarded to the Office. The copies should be stapled together only at the upper left-hand margin at the indicated location.

Copies of form PTO–1050 may be obtained, as needed, from either the Correspondence and Mail Division in Building 2, or from the receptionist in the lobby of Building 3, Crystal Plaza, Arlington, Va.

May 10, 1977.

RICHARD J. SHAKMAN,
Assistant Commissioner for Administration.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MAY 7, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	7-26-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	5-4-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	8-27-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	7-12-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	11-26-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	3-15-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	6-1-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	11-22-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	5-3-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	10-28-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	5-24-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	9-10-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	6-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	6-11-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	10-12-76

Expiration of patents: The patents within the range of numbers indicated below expire during May 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,934,766 to 2,939,144, inclusive
Plant Patents..... Numbers 1,938 to 1,948, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED JUNE 7, 1977

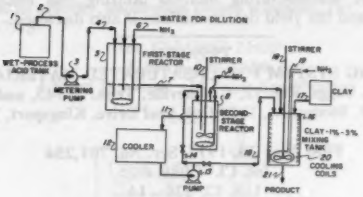
Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T959,001
PRODUCTION OF SUSPENSION FERTILIZERS FROM WET-PROCESS ORTHOPHOSPHORIC ACIDS

Thomas M. Jones, Sheffield, Ala., assignor to Tennessee Valley Authority

Filed July 2, 1976, Ser. No. 702,209
Int. Cl.² C05B *7/00*
U.S. Cl. 71—34
3 Sheets Drawing. 27 Pages Specification



A process for preparing concentrated, high-grade, nitrogen-phosphate ($N—P_2O_5$) base suspension fertilizer from wet-process or other impure orthophosphoric acids. The process involves a new procedure for the direct ammoniation of orthophosphoric acid in stages for production of fluid, high-analysis, $N—P_2O_5$ suspension fertilizer with good physical properties. The new process contains a novel method for prevention of settling of crystals in the suspension during vibration, such as that which occurs during shipment. Settling is avoided by producing small, thin crystals of diammonium phosphate through control of the $N:P_2O_5$ ratio and temperature in the second and third ammoniation stages.

T959,002
SPINNERET

Robert Ellis Clark, 611 Northgate Ave., Waynesboro, Va. 22980

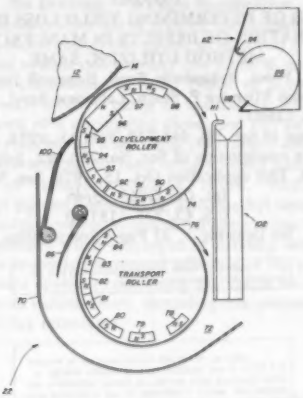
Filed Oct. 27, 1976, Ser. No. 735,993
Int. Cl.² C22C *38/22*
U.S. Cl. 75—126 C
No Drawing. 9 Pages Specification

Spinnerets made of a stainless steel alloy containing 28% to 30% chromium, 3.5% to 4.2% molybdenum, and a maximum of 0.15% nickel have unexpectedly good resistance to corrosion when subjected to a $KNO_3/NaNO_2/NaNO_3$ salt bath at about 427° C (about 800° F) for cleaning, as well as unusually good resistance to corrosion when exposed to acrylontrile polymer spinning solution. The overall corrosion rate, resulting from repeated cycles of spinning followed by salt bath cleaning, is surprisingly low, leading to a long expected wear life. The spinnerets have high strength, with good resistance to bulging in use.

T959,003
ELECTROSTATIC PROCESS DEVELOPMENT APPARATUS

Joan Helen Hull, Elmgrove Plant, Rochester, N. Y. 14550

Filed Oct. 5, 1976, Ser. No. 729,623
Int. Cl.² G03G *15/09*
U.S. Cl. 118—658
4 Sheets Drawing. 20 Pages Specification

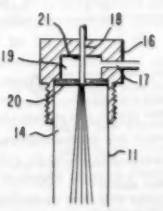


Apparatus for developing a latent image in electrophotographic or electrostatic processes includes a magnet assembly for forming a magnetic developing brush which can be supplied with and carry a developer mix in a development region. The magnet assembly includes a plurality of curved, sector shaped magnets for carrying the mix to and from the development region and a rectangular cross-sectional magnet of greater magnetic force at the development region.

T959,004
CHROMATOGRAPHIC LIQUID DISPENSING INLET AND METHOD

Joseph Jack Kirkland, Wilmington, and Charles Heritage Dilks, Jr., Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 26, 1976, Ser. No. 690,314
Int. Cl.² B01D *15/08*
U.S. Cl. 210—31 C
1 Sheet Drawing. 14 Pages Specification



The chromatographic separation efficiency of a sample liquid injected into a resolving zone and eluted through the resolving

zone with a liquid carrier or mobile phase is improved if the sample is injected at a point located centrally on the inlet end of the resolving zone and the eluting carrier liquid is applied uniformly across substantially the entire inlet end of the resolving zone surrounding the sample injection point.

To accomplish this, the present invention provides a liquid dispensing inlet for a liquid chromatographic column comprising: a housing having formed therein a recess and first and second channels; each channel connecting the recess to the external surface of the housing, and a dispensing tube for dispensing liquid to a point at the inlet end of the column, the dispensing tube being disposed within the recess with one end connected to the second channel of the housing and the second end being disposed adjacent to the inlet end of the column, the inlet further comprises a dispensing member, in the form of a screen or a porous plate, dispose between the inlet end of the column and the recess in the housing.

T959,005
METHOD OF DETERMINING YIELD LOSS DUE TO A COMBINATION OF DEFECTS IN MANUFACTURING METHOD UTILIZING SAME

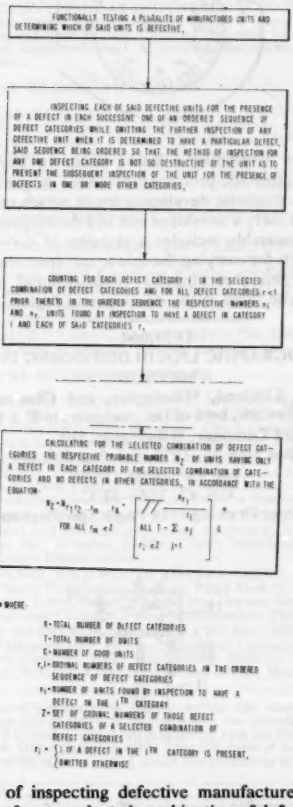
Howard A. Froot, Bykenhulle Road, Hopewell Junction, N.Y. 12533, and Vijendra P. Singh, Lakeview Road, Poughkeepsie, N.Y. 12603

Continuation of Ser. No. 441,728, Feb. 11, 1974, abandoned, which is a continuation of Ser. No. 268,382, July 3, 1972, abandoned. This application Oct. 15, 1976, Ser. No. 732,565

Int. Cl.[2] G06F *15/46*

U.S. Cl. 235—151.13

No Drawing. 33 Pages Specification


FUNCTIONALLY TESTING A PLURALITY OF MANUFACTURED UNITS AND DETERMINING WHICH OF SAID UNITS IS DEFECTIVE.
INSPECTING EACH OF SAID DEFECTIVE UNITS FOR THE PRESENCE OF A DEFECT IN EACH SUCCESSIVE ONE OF AN ORDERED SEQUENCE OF DEFECT CATEGORIES WHILE OMITTING THE FURTHER INSPECTION OF ANY DEFECTIVE UNIT WHEN IT IS DETERMINED TO HAVE A PARTICULAR DEFECT, SAID SEQUENCE BEING ORDERED SO THAT THE METHOD OF INSPECTION FOR ANY ONE DEFECT CATEGORY IS NOT SO DESTRUCTIVE OF THE UNIT AS TO PREVENT THE SUBSEQUENT INSPECTION OF THE UNIT FOR THE PRESENCE OF DEFECTS IN ONE OR MORE OTHER CATEGORIES.
COUNTING FOR EACH DEFECT CATEGORY i IN THE SELECTED COMBINATION OF DEFECT CATEGORIES AND FOR ALL DEFECT CATEGORIES r<i PRIOR THERETO IN THE ORDERED SEQUENCE THE RESPECTIVE NUMBERS n_i AND n_{r_i} UNITS FOUND BY INSPECTION TO HAVE A DEFECT IN CATEGORY i AND EACH OF SAID CATEGORIES r_i.
CALCULATING FOR THE SELECTED COMBINATION OF DEFECT CATEGORIES THE RESPECTIVE PROBABLE NUMBER B_Z OF UNITS HAVING ONLY A DEFECT IN EACH CATEGORY OF THE SELECTED COMBINATION OF CATEGORIES AND NO DEFECTS IN OTHER CATEGORIES, IN ACCORDANCE WITH THE EQUATION
$B_Z = B_{r_1 r_2 \cdots r_m \cdots r_R} = \left[\frac{n_{r_1}}{r_1}\right] \cdots$
FOR ALL $r_m \in Z$
ALL $i - \sum n_j$
$r_i \in Z$ $j=1$
WHERE
R = TOTAL NUMBER OF DEFECT CATEGORIES
T = TOTAL NUMBER OF UNITS
G = NUMBER OF GOOD UNITS
r_i = ORDINAL NUMBERS OF DEFECT CATEGORIES IN THE ORDERED SEQUENCE OF DEFECT CATEGORIES
n_{r_i} = NUMBER OF UNITS FOUND BY INSPECTION TO HAVE A DEFECT IN THE i^{TH} CATEGORY
Z = SET OF ORDINAL NUMBERS OF THOSE DEFECT CATEGORIES OF A SELECTED COMBINATION OF DEFECT CATEGORIES
$r_i = \begin{cases} 1 \text{ IF A DEFECT IN THE } i^{TH} \text{ CATEGORY IS PRESENT,} \\ 0 \text{ OMITTED OTHERWISE} \end{cases}$

A method of inspecting defective manufactured units and determining for any selected combination of defect categories the respective probable number of units having only a defect in each category of the selected combination of categories, and also the yield loss due to the selected combination of categories. The defect categories are arranged in an ordered sequence. Each unit of a sample of the manufactured units is inspected for the presence of a defect in each successive one of the ordered sequence of defect categories. As soon as it is determined that an inspected unit has a defect in a particular category, all further inspection of the unit is omitted and the unit is not inspected for the presence of defects in the subsequent categories of the sequence. From the resulting data there is determined for the selected combination of defect categories the respective probable number of units having only a defect in each category of the selected combination of categories and no defect in other categories. There is also determined for the selected combination of categories of defects the yield increase that may be expected by a change in the manufacturing process to eliminate the manufacture of any units having defects in the selected combination of categories. A manufacturing method utilizing this inspection method and the yield determinations is also disclosed.

T959,006
CURING SYSTEM FOR UNSATURATED MATERIALS

James L. Suggs, Rte. 12, Greeneville, Tenn. 37743, and William W. Blount, Jr., 1129 Oak Leaf Drive, Kingsport, Tenn. 37663

Filed June 30, 1976, Ser. No. 701,254

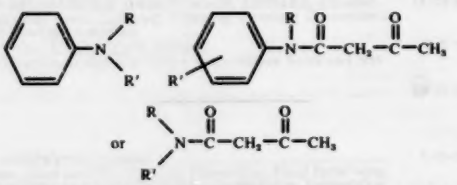
Int. Cl.[2] C08F *4/26*

U.S. Cl. 526—14

No Drawing. 11 Pages Specification

This invention concerns novel curing systems useful for curing unsaturated polyester/monomer mixtures such as the polyester of propylene glycol, phthalic anhydride and maleic anhydride, with styrene as the monomer. The curing system is the complex formed by the reaction of (1) a cobalt compound, such as $Co(OH)_2$ or $CoCO_3$ (2) and acid of the formula

wherein R is a straight or branched alkyl of 1–20 carbons which may be monosubstituted with hydroxyl, aryl of 6–10 ring carbons and cycloaliphatic of 6–10 ring carbons, and (3) a nitrogen component of the formula



wherein R and R′ are independently selected from straight and branched alkyl of 1–10 carbon atoms which may be monosubstituted with hydroxyl. The acid residue in the complex comprises from about 0.2 to about 20.0% by weight of said complex, the cobalt compound, as percent cobalt metal, from about 0.1 to about 10.0% by weight, and the nitrogen compound residue from about 65 to about 90% by weight. The complex is prepared, for example, by mixing the components and heating for at least about one hour from about 100° C to about 200° C.

T959,007
COATING COMPOSITIONS

Robert R. Sanders, 4526 Ronald Drive, Kingsport, Tenn. 37664

Filed Sept. 27, 1976, Ser. No. 726,902

Int. Cl.[2] C08L *1/14*

U.S. Cl. 260—16

No Drawing. 30 Pages Specification

Compositions comprising an organic cellulose ester, an oil-modified alkyd resin, and a solvent blend useful for coating

substrates such as wood for protection and appearance are disclosed. The solvent blend contains a component which is a solvent for the organic cellulose ester and a component which is a solvent for the oil-modified alkyd resin. The solvents are chosen from aromatic hydrocarbons, alcohols, aliphatic hydrocarbons, esters and ketones. The solvents and the quantities thereof are chosen using their evaporation rates as guidelines, such that the evaporation time of the solvent component for the organic cellulose ester and the evaporation time for the oil-modified alkyd resin are about equal. It is found that selection of solvents on this basis eliminates or significantly decreases haze and in most cases improves other physical properties in film of coating thickness formed from these compositions.

T959,008

METHOD OF TREATING POLYMER LATICES

Bala Perampalam Chandra, Huntingdon, England, assignor to Imperial Chemical Industries Limited, London, England

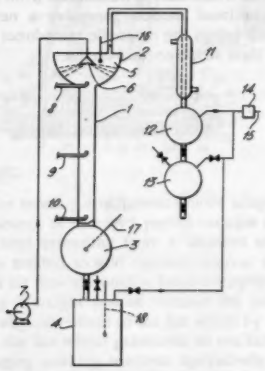
Filed Oct. 4, 1976, Ser. No. 728,919

Claims priority, application United Kingdom, Oct. 13, 1975, 41847/75

Int. Cl.² C08F *27/00*

U.S. Cl. 528—500

1 Sheet Drawing. 14 Pages Specification



A method of continuously treating an aqueous latex of a synthetic polymer which contains unreacted residual monomer from the polymerization reaction used for the production of the polymer, which method comprises feeding the aqueous latex as a spray into the top of a vertical column so that it forms a liquid film on the inner surface thereof which film then flows down the column, and contacting the spray and the descending film with an upward flow of a hot inert gas or vapor whereby residual monomer is separated from the latex and is removed with the flow of inert gas or vapor leaving the column. Apparatus for carrying out the method is also claimed. The method is advantageously employed for the removal of residual vinyl chloride monomer from a latex of a vinyl chloride polymer.

T959,009

PROCESS FOR POWDERING SEMI-CRYSTALLINE POLYESTER PELLETS

Richard Leon McConnell, 421 Manderley Road, Kingsport, Tenn. 37660, and Doyle Allen Weemes, 1603 Moore Ave., Greeneville, Tenn. 37743

Filed Dec. 16, 1976, Ser. No. 751,787

Int. Cl.² C08G *63/74*

U.S. Cl. 260—75 T

No Drawing. 13 Pages Specification

Process for converting semi-crystalline polyester pellets into powder without cryogenically grinding, the polyester pellets being derived from polyester polymers having a melting point of about 80°–140° C. and a ΔH_f of ≤ 10, by heating the polyester pellets to a temperature of about 130° C. to about 200° C. in an admixture of about 200 to about 1,000 parts of water based on 100 parts of polymer, of about 15 to about 150 parts of organic solvent selected from aromatic and chlorinated solvents such as toluene, xylene, benzene, chloroform, methylene chloride, and about 5 to about 25 parts of a wetting agent comprising a block copolymer of ethylene oxide and propylene oxide having a molecular weight of about 8,000 to about 13,500; the admixture is cooled to ambient temperature while stirring; then the admixture is filtered to remove the water and the solvent from the resulting polyester powder; and finally the filtered powder is washed to remove the wetting agent.

T959,010

PRINTING INK RESIN COMPOSITION

David R. Hansen, 15918 Red Willow, Houston, Tex. 77043

Filed Aug. 19, 1976, Ser. No. 715,953

Int. Cl.² C08L *45/00*, *53/00*

U.S. Cl. 260—829

No Drawing. 8 Pages Specification

A resin composition for use in printing ink compositions comprises (a) a block copolymer having at least two polymer end blocks A and at least one polymer mid block B, each block A being a non-elastomeric polymer block of a monoalkenyl arene and each block B being an elastomeric hydrogenated polymer block of a conjugated diene; and (b) an end block compatible resin having a softening point above about 100° C, said end block compatible resin being selected from the group consisting of coumarone-indene resins, vinyl toluene-alphamethyl styrene copolymers, alphamethyl styrene homopolymers, polyindene resins and polystyrene resins. The above resin composition when employed in printing ink compositions results in a much improved adhesion of the printing ink to certain wire coatings comprising the above block copolymer along with various fillers, extending oils, polymeric alpha-olefins, and fire retardants.

T959,011

TRANSPARENT HIGH-IMPACT POLYSTYRENE RESINS AND THEIR MANUFACTURE

Robert Clarence Smith, 1737 Hollywood St., Warren, Ohio 44483

Continuation of Ser. No. 558,039, March 13, 1975, abandoned, which is a continuation of Ser. No. 429,332, Dec. 28, 1973, abandoned. This application May 14, 1976, Ser. No. 686,626

Int. Cl.² C08L *53/00*

U.S. Cl. 260—876 B

No Drawing. 18 Pages Specification

A transparent, high impact resin is produced by blending from 15 to 50 parts by weight of an impact modifier with from 85 to 50 parts by weight of clear crystal polystyrene. The impact modifier is a copolymer of a conjugated diene of from 4 to 6 carbon atoms and styrene, containing from 50 to 80 parts of styrene and from 20 to 50 parts of the conjugated diene. Further, the impact modifier consists of randomized copolymers or multiblock copolymers, and the polydiene blocks contained therein are of substantially 40,000 to 60,000 molecular weight. Higher molecular weights than 60,000 in the polydiene blocks give resins which are not transparent, while lower molecular weights than 40,000 give impact resistance which is lower than desired. Blending can be done in any convenient manner, either in solvent solution or otherwise. The transparent products can be used in packaging applications requiring varying thicknesses, from films to rigid molded or cast containers.

T959,012

DYNAMIC DESKEWING FOR A ROTATING HEAD RECORDING DEVICE

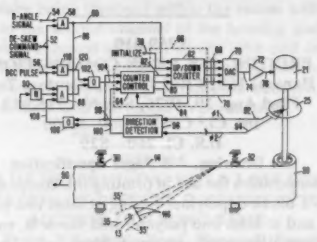
Nelson Kay Arter, 8687 Morton Rod, Longmont, Colo. 80501; Thomas Franklin Eichhorn, 8555 Hollyhock Lane, Lafayette, Colo. 80026, and Howard Carl Jackson, 808 E. Cty. Road, No. 4, Berthoud, Colo. 80513

Filed May 3, 1976, Ser. No. 682,549

Int. Cl.² G11B *21/10*

U.S. Cl. 360—76

2 Sheets Drawing. 36 Pages Specification



In a rotating head magnetic media transport device, skew between data tracks recorded on the magnetic media and a magnetic transducer is corrected, dynamically, by a closed loop controlled servo system. When the magnetic transducer is not in transducing relationship with magnetic media 14 (that is, the magnetic transducer is not under the tape), an offset number is placed into stop/lock counting means 66. The stop/lock counting means is positioned within the closed loop of the servo system. The stop/lock counting means outputs a series of pulses as the offset number is decremented to zero. The pulses are converted to analog voltages which in turn energize a motor which rotates a take-up spool (capstan) on which the media is wound while passing said magnetic transducer. Due to lateral translation of said media, whenever the count in the stop/lock counting means is zero the magnetic transducer is positioned in registry with the selected data track on the magnetic media.

When the magnetic transducer is in transducing relationship with the media (i.e. under the media) a relatively low value digital number, for example, "one" is loaded into the stop/lock counting means. In like fashion, the "one" is decremented to zero. This process (i.e. the loading/decrementing) continues for a selected number of times or until the magnetic transducer exits the magnetic media. As the stop/lock counting means is loaded and decremented, a pulse is outputted which controls the take-up spool motor to continually step the media a finite distance, which in effect, continually alters the effective angle at which data is transduced from the magnetic media. This continual motion generates a new head/tape trajectory which brings the magnetic transducer into registry with the skew data stripe on said media.

REISSUES

JUNE 7, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,247

SURFACE TREATING ATTACHMENT DEVICE

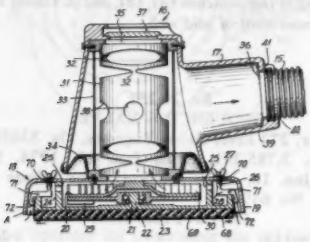
Lars Gunnar Kilstrom, Taby, and Goran Arvid Henning Ridderstrom, Stockholm, both of Sweden, assignors to Aktiebolaget Electrolux, Stockholm, Sweden

Original No. 3,864,784, dated Feb. 11, 1975, Ser. No. 338,370, Mar. 5, 1973. Application for reissue May 5, 1976, Ser. No. 651,478

Claims priority, application Sweden, Feb. 7, 1973, 7301671; Mar. 7, 1972, 2834/72

Int. Cl.² A47L *5/30, 9/24*

U.S. Cl. 15—380 **15 Claims**



1. A surface treating attachment device adapted to be connected to a source of at least a partial vacuum comprising: an air flow channel extending from a location adjacent to the surface to be treated to said vacuum source, a rotatable fan wheel in said air flow channel, a handle-shaped part, said fan wheel having a weight placed outside the axis of rotation thereof whereby movement of the fan wheel by the air striking the vanes of the fan wheel generates an oscillating motion, a surface engaging working member operatively connected to said fan wheel whereby the oscillating motion generated by the fan wheel is transmitted to the working member which in turn oscillates in a plane that is generally parallel to the work surface, and energy absorbing means for operatively connecting said handle-shaped part to said working member which absorbs the movement of the working member in two directions that are generally perpendicular to each other.

Re. 29,248

CONTAINER

Wayne Congleton, Walnut, Calif., assignor to Dolco Packaging Corporation, Burbank, Calif.

Original No. 3,868,054, dated Feb. 25, 1975, Ser. No. 343,605, Mar. 21, 1973. Continuation-in-part of Ser. No. 273,558, July 20, 1972, Pat. No. 3,834,609. Application for reissue Mar. 20, 1975, Ser. No. 560,436

Int. Cl.² B65D *85/52;* **A01G** *9/10*

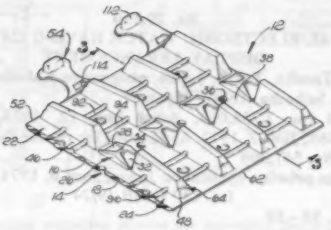
U.S. Cl. 47—77 **12 Claims**

14. An improved container assembly for containing plants, seeds or seedlings in soil for shipment, comprising:

an integral one-piece member which when unassembled is in a generally planar configuration and has first and second side edges;

a plurality of hinge lines formed in said member each along the axis of said container from said first side edge to said second side edge for enabling said member to be folded into a predetermined shape and for dividing the member into a first section, a second section and a central section, said central section interconnecting said first and second sections, said first, second and central sections constituting at least the major surface areas of said container;

each of said sections being formed with a plurality of hollow ribs formed by indentations therein spaced inwardly from the side edges and spaced one from another along the axis of said container, said ribs interacting when said member is folded along said hinge lines so as to form a structure of generally U-shaped cross-sectional configuration, the interaction of the ribs formed in said side sections being along substantially their entire lengths so as to divide said container into a plurality of discrete compartments, said structure having a pair of free edges spaced apart from the other a distance defined by the interacting ribs of said side sections, said free edges defining the ends of said U-shaped configuration;



a tab member having a first end integrally formed with one of said edges, and a free end adapted to be positioned adjacent the other of said edges for retaining said assembly in said U-shaped cross-sectional configuration.

Re. 29,249

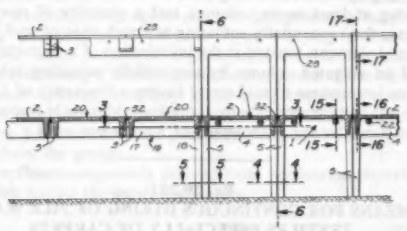
PRECAST CONCRETE BUILDING CONSTRUCTION

Edward K. Rice, Los Angeles, Calif., assignor to Unicon Parking Structures, Inc., Van Nuys, Calif.

Original No. 3,744,200, dated July 10, 1973, Ser. No. 837,986, June 2, 1969. Application for reissue Aug. 26, 1974, Ser. No. 500,650

Int. Cl.² E04B *1/343;* **E04C** *3/20*

U.S. Cl. 52—227 **24 Claims**



1. A multiple story garage structure, comprising:

a. a first set of precast concrete building units, each unit thereof including an elongated rectangular slab and legs at the ends thereof, the slabs *having substantially continuous upper and lower surfaces except for vertical tendon passages at said legs and* being arranged *coplanar* in side-by-side and end-to-end relation and the legs disposed in rows under the ends of the slabs, the rows of legs defining therebetween rows of parking spaces adjacent the legs and access lanes between the parking spaces;

b. a second set of precast concrete building units, each unit

of the second set including a beam and a leg at each end thereof, the members of the second set of building units being disposed in longitudinal alignment with the rows of legs of the first set at the ends thereof to define transversely extending corridors connecting the access lanes;

c. a third set of precast concrete building units, each unit of the third set including a slab and at least one beam thereunder, the ends of the members of the third set of building units resting on the beams of the second set of building units and continuing in *coplanar* side-by-side and end-to-end relation from the slabs of the first set of building units;

d. and means securing the sets of building units in their assembled relation.

Re. 29,250

DIGITAL ELECTRONIC WATCH HAVING CALENDAR DISPLAY ARRANGEMENT

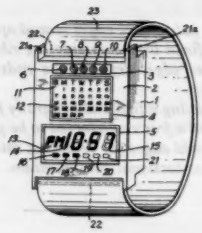
Kojiro Tanaka, Tokyo, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Original No. 3,738,099, dated June 12, 1973, Ser. No. 260,685, June 7, 1972. Application for reissue Feb. 5, 1975, Ser. No. 547,308

Claims priority, application Japan, June 6, 1971, 46-40713

Int. Cl.² G04B *19/24*

U.S. Cl. 58—58 **19 Claims**



1. A digital electronic watch comprising a time standard oscillator for producing a high frequency time standard signal; circuit means for dividing said high frequency time standard signal into at least minute and hour display driving signals; liquid crystal display means for displaying time in response to said minute and hour driving signals; further circuit means for producing signals having a frequency of 1 pulse per day and 1 pulse per week from said first-mentioned circuit means; calendar display means including a matrix of liquid crystal elements having at least seven columns and a plurality of rows and means for sequentially actuating selected ones of said liquid crystal elements located at the intersection of an actuated row and an actuated column by sequentially actuating said columns in response to said signal having a frequency of 1 pulse per day and for sequentially actuating said rows in response to said signal having a frequency of 1 pulse per week.

Re. 29,251

MEANS FOR CONTINUOUS DYEING OF PILE WARP TEXTILES ESPECIALLY OF CARPETS

Valentin Appenzeller, Kempen, and Johannes Kutz, Krefeld, both of Germany, assignors to Eduard Küesters Maschinenfabrik, Krefeld, Germany

Original No. 3,541,815, dated Nov. 24, 1970, Ser. No. 650,450, June 30, 1967. Continuation of Ser. No. 308,710, Nov. 22, 1972, abandoned. Application for reissue Dec. 18, 1974, Ser. No. 534,128

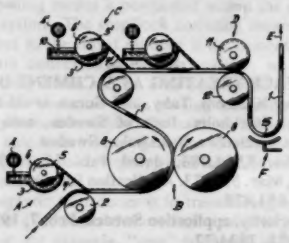
Int. Cl.² D06B *1/06*

U.S. Cl. 68—22 R **20 Claims**

9. Apparatus for dyeing a continuously moving pile warp textile web which comprises:

(A) means to apply a wetting agent to said web;

(B) means to apply uniform pressure to said web to improve the penetration of said wetting agent; and



(C) at least one means to apply a uniform, continuous dye film to the pile warp of said web, wherein each of said means is positioned in the sequence (A), (B), and (C) along the direction of movement of said web.

Re. 29,252

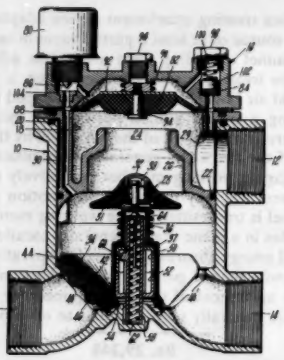
SEQUENCING VALVE

Bob C. Miller, 272 River Drive, Tequesta, Fla. 33458

Original No. 3,785,391, dated Jan. 15, 1974, Ser. No. 324,236, Jan. 16, 1973. Application for reissue Jan. 15, 1976, Ser. No. 649,452

Int. Cl.² F16K *21/00*

U.S. Cl. 137—119 **20 Claims**



18. A sequencing valve comprising:

housing means, said housing means defining an inlet and a plurality of outlet ports displaced from said inlet, said housing means further defining an internal flow passage whereby fluid communication may be established between said inlet and said outlet ports;

valve means disposed in said housing means, said valve means being reciprocal in response to fluid flow through the valve and rotatable and cooperating with said outlet ports to perform a valving function, said valve means having at least a first opening therein whereby communication between at least one of said outlet ports and said flow passage will be established at all times;

pressure responsive means disposed in said housing means, said pressure responsive means being operatively coupled to said valve means for movement therewith and also being movable relative to said valve means in response to flow through the valve to form a variable restriction in said flow passage upstream of said valve means; and

cam means disposed in said housing means for causing stepwise rotation of said valve means in response to reciprocation thereof.

Re. 29,253

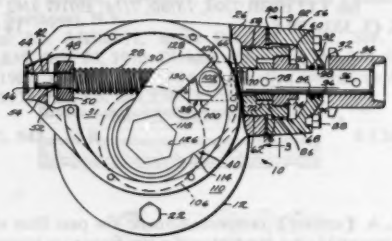
VALVE OPERATOR FOR BUTTERFLY VALVES OR THE LIKE

Joseph L. Daghe, Decatur, Ill., and Richard A. Stultz, Franklin, Ohio, assignors to Mueller Co., Decatur, Ill.

Original No. 3,877,677, dated Apr. 15, 1975, Ser. No. 448,715, Mar. 6, 1974. Application for reissue Apr. 12, 1976, Ser. No. 676,343

Int. Cl.² F16L 27/02

U.S. Cl. 251—228 24 Claims



1. A valve operator for controlling the movement of and adjustably controlling the limits of such movement of a valve member carried by a rotatable valve shaft of a valve, said valve operator comprising:

a housing member associated with the valve and defining an enclosed chamber;

an operating shaft having one end portion extending through said housing and having threads on a second portion of the same within the housing;

means for supporting said operating shaft in an adjusted axial position and for rotatable movement, said means including an adjustable collar threadedly received in said housing and having an exterior non-circular configuration on a portion extending exteriorly of said housing, a stem bushing fixed to said operating shaft and a stem retainer nut carried by said adjustment collar and retaining said stem bushing axially fixed with respect to the adjustment collar;

an operating nut carried on the threaded portion of said operating shaft and movable axially on said operating shaft when said operating shaft is rotated;

stop means on said adjustment collar for engaging said operating nut and limiting its movement in one direction and a second stop means carried by said operating shaft for engaging said operating nut and limiting movement in an opposite direction;

means coupling the operating nut to the valve shaft for rotating the valve shaft;

and an adjustment cap having a non-circular interior configuration complementary to the non-circular exterior configuration of said adjustment collar and covering the same with an end portion of said operating shaft extending through the cap, said adjustment cap being bolted to said housing and having a slight lost motion play with said adjustment collar whereby said adjustment cap can be unbolted from said housing and rotated in one direction or the other to cause rotation of said adjustment collar to simultaneously adjust said first and second stop means and then rotated in reverse direction for rebolting without affecting the adjustment.

Re. 29,254

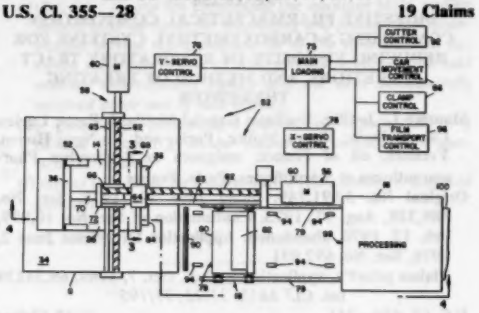
MICROFICHE RECORDER AND PROCESSOR

Rolf D. Kahle, Saratoga; David K. Studley, Santa Clara, and James D. Bryson, Sunnyvale, all of Calif., assignors to Quantor Corporation, Mountain View, Calif.

Original No. 3,746,444, dated July 17, 1973, Ser. No. 201,642, Nov. 24, 1971. Continuation of Ser. No. 456,332, March 29, 1974, abandoned. Application for reissue July 14, 1975, Ser. No. 595,457

Int. Cl.² G03B 29/00, 27/44, 27/60

U.S. Cl. 355—28 19 Claims



16. An optical recording system for recording projected images on a film comprising: a platen assembly having a flat side and means for maintaining a film section flat on the side to assure high resolution recording, means for projecting small images onto the film section, means permitting movement of the assembly parallel to the film so that substantially every portion of the film section can be exposed to an image focused on the film, means for moving the assembly in X and Y directions, means for intermittently withdrawing exposed film sections from the side to thereby simultaneously advance a fresh, unexposed film section to the side, and means for severing the exposed section before the fresh section has been fully exposed.

Re. 29,255

PHOTOGRAPHIC LAYERS CONTAINING PERFLUORO COMPOUNDS AND COATING THEREOF

Maurice James McDowell, Media, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Original No. 3,589,906, dated June 29, 1971, Ser. No. 768,169, Oct. 16, 1968. Application for reissue May 25, 1973, Ser. No. 364,146

Int. Cl.² G03C 1/38, 1/33

U.S. Cl. 96—87 R 16 Claims

1. A coated photographic element comprising a support bearing a hydrophobic polymer layer carrying a macromolecular water-permeable organic colloid layer characterized by containing a perfluorocarbon compound [having an intralinear carbonyl or sulfonyl group and] capable of reducing the surface tension of water to 15–20 dynes. per [square] centimeter, said perfluoro compound being [selected from the group:

(1) perfluorocompounds derived from perfluorocarboxylic acids having the general structure

where C_f is a fully fluorinated (perfluoro) saturated chain consisting of five or more carbon atoms which may or may not be an oxygen-interrupted carbon chain; X=OY or an amino group, where Y is H, alkali metal or an ammonium group, and

(2) perfluoro compounds] derived from perfluorosulfonic and perfluorosulfuric acids having the general structure

(C_f) [$_a$] $(C_n)_s(X)(Z)$

where C_f is a fully fluorinated (*perfluoro*) *saturated* carbon chain [as defined in paragraph (1)] *having six or more carbon atoms which may or may not be an oxygen-interrupted carbon chain*; C_H is the saturated hydrocarbon portion of the same chain; X is SO_2 or SO_3; Z is an amino or hydroxyl group, alkali metal or an ammonium group; [x=6 or greater; Y=2 or more;] *y=0 or more;* said element having radiation-sensitive silver halide in intimate association with said colloid layer.

Re. 29,256
DIGESTIVE PHARMACEUTICAL COMPOSITION COMPRISING S-CARBOXYMETHYL CYSTEINE FOR REDUCING VISCOSITY OF RESPIRATORY TRACT SECRETIONS, AND METHOD OF TREATING THEREWITH

Maurice L. Joullié, Yvelines; Gabriel Maillard, Paris; Lucien Lakah, Paris; Pierre Muller, Paris, and Vu-Ngoc Huyen, Yvelines, all of France, assignors to Recherches Pharmaceutiques et Scientifiques, Paris, France

Original No. 3,891,749, dated June 24, 1975, Ser. No. 389,325, Aug. 17, 1973. Continuation of Ser. No. 10,999, Feb. 12, 1970, abandoned. Application for reissue June 2, 1976, Ser. No. 692,031

Claims priority, application France, Oct. 7, 1969, 69.34139

Int. Cl.² A61U *31/22, 31/195*

U.S. Cl. 424—311 **18 Claims**

19. A pharmaceutical preparation in dosage unit form adapted for administration by the digestive route and for the reduction of viscosity of secretions of the respiratory tract, selected from the group consisting of a suppository, syrup, pill, capsule, or tablet and comprising, per dosage unit, an effective amount of S-carboxymethyl cysteine to accomplish said reduction, and a pharmaceutical diluent.

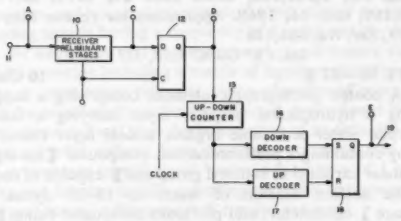
Re. 29,257
DIGITAL FILTER FOR A DIGITAL DEMODULATION RECEIVER

Harold G. Nash, Tempe, Ariz., and Michael F. Wiles, Round Rock, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Original No. 3,814,918, dated June 4, 1974, Ser. No. 374,613, June 28, 1973. Application for reissue Nov. 20, 1975, Ser. No. 633,725

Int. Cl.² H04B *1/16*

U.S. Cl. 235—152 **7 Claims**



1. In a digital demodulation receiver for receiving an input periodic oscillation signal of a first frequency, designated a binary 1, and of a second frequency, designated a binary 0, and for providing indicia signals representative of whether the signals are of the 1 or 0 frequency, a digital filter comprising:

a. clock pulse means for producing pulses at a prescribed frequency;

b. storage means, receiving the indicia signals, for providing a first output signal substantially continuously in the presence of 1 input signal, and a second output signal substantially continuously in the presence of a 0 input signal; and

c. up-down counting means connected to the clock pulse means and to the storage means, for receiving pulses from the clock pulse means as conditioned by the first output signal from the storage means to count in one direction to a first threshold count, and as conditioned by the second *output signal from the* storage means to count in the other direction to a second threshold count.

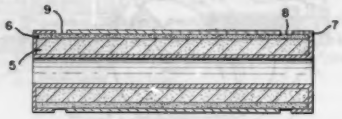
Re. 29,258
COATED FERRITE RF FILTERS

William Baird Fritz, Hershey, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Original No. 3,743,978, dated July 3, 1973, Ser. No. 88,042, Nov. 9, 1970. Continuation-in-part of Ser. No. 883,501, Dec. 9, 1969, abandoned. Application for reissue Jan. 22, 1975, Ser. No. 543,097

Int. Cl.² H03H *7/04, 13/00, 7/14;* **H01G** *4/42*

U.S. Cl. 333—70 S **14 Claims**



1. A [unitary] *composite ceramic* low pass filter element for mounting on a conductor of a low frequency transmission line to attenuate high frequencies thereon comprising,

a conductive tubular member for receiving a conductor therein,

a semiconductive substrate in the form of a sleeve secured to the outer surface of the tubular member in intimate engagement therewith,

a *ceramic dielectric* layer [of dielectric material] covering the outer surface of the sleeve in direct intimate contact therewith,

and an outer conductive layer disposed about and secured to the dielectric [material] *layer* substantially the length thereof for connecting the unitary filter element to ground.

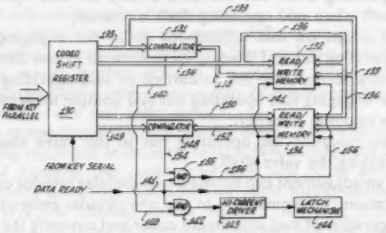
Re. 29,259
SELF RE-KEYING SECURITY DEVICE

Daniel M. Sabsay, 329 Harvard St., No. 31, Cambridge, Mass. 02139

Original No. 3,821,704, dated June 28, 1974, Ser. No. 351,298, Apr. 16, 1973. Application for reissue June 28, 1965, Ser. No. 700,554

Int. Cl.² H04Q *3/00*

U.S. Cl. 340—149 A **21 Claims**



1. The method of operating security device, comprising the steps of

entering into said security device a key number and an authorization number,

comparing the key number with a combination number previously stored in said security device,

operating said security device, if the compared numbers are found to match,

comparing the authorization number with the combination

number previously stored in said security device, if the key number was found not to match the combination number,

causing the key number to be stored in said security device in place of the previously stored combination number, if the authorization number was found to match the combination number, and,

operating said security device, if the authorization number was found to match the combination number.

Re. 29,260

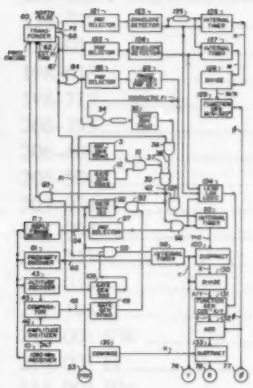
PROXIMITY INDICATION WITH RANGE AND BEARING MEASUREMENTS

George B. Litchford, Northport, N.Y., assignor to Litchstreet Co., Northport, N.Y.

Original No. 3,858,211, dated Dec. 31, 1974, Ser. No. 371,839, June 20, 1973. Division of Ser. No. 180,578, Sept. 15, 1971, Pat. No. 3,757,324. Application for reissue Apr. 15, 1975, Ser. No. 568,270

Int. Cl.² G01S 9/56

U.S. Cl. 343—16 R **8 Claims**



2. Apparatus for determining at an own transponder station the bearing angle ϕ of said own station from a selected [azimuthally scanning radar that omnidirectionally transmits a] *one of a plurality of secondary surveillance radars (SSR) that transmit directional interrogation signals of the same frequency and that omniazimuthally transmit* reference [signal when its directional beam points in a standard] *signals as the main radar beams thereof sweep through a standardized* reference direction, such as *magnetic* North, said apparatus comprising:

(a) means for receiving said reference [signal] *signals* and for receiving the [normal] interrogation transmission signals of said *radars* as the radar [beam sweeps] *beams sweep* by the own location,

(b) [a first interval timer for measuring the interval between successive reception of one of said reference and said normal transmission signals and producing a quantitative representation N of said interval,] *means for selecting the reference and interrogation signals received from one of said secondary surveillance radars,*

(c) [a second interval timer for measuring and producing quantitative representation M of the interval between reception of a reference signal and a normal transmission signal,] *a first interval timer for measuring the interval between successive reception of one of said selected reference and said selected interrogation signals and producing a quantitative representation N of said interval,*

(d) [divider means for computing the quotient M/N, and] *a second interval timer for measuring and producing a quantitative second representation M of the time interval between reception of one of said selected reference and said selected interrogation signals and the next subsequently received other one of said signals,*

(e) [means for producing a quantitative representation ϕ of said quotient.] *divider means for computing the quotient M/N, and*

(f) means for producing a quantitative representation ϕ of said quotient.

Re. 29,261

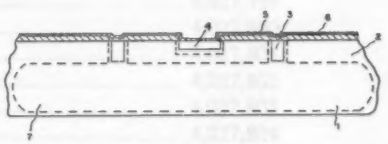
GATED SILICON DIODE ARRAY CAMERA TUBE

Joze Kostelec, Stamford, Conn., assignor to North American Philips Corporation, New York, N.Y.

Original No. 3,916,429, dated Oct. 28, 1975, Ser. No. 433,286, Jan. 14, 1974. Continuation of Ser. No. 209,533, Dec. 20, 1971, abandoned. Application for reissue Apr. 9, 1976, Ser. No. 675,646

Int. Cl.² H01L 27/14

U.S. Cl. 357—31 **9 Claims**



1. A device for converting light into an electrical signal comprising a semiconductive wafer having a light-receiving surface through which the light enters the wafer and produces photogenerated carriers in response to absorbed light, the wafer having adjacent one surface thereof remote from the light-receiving surface a first array of discrete rectifying barriers for collecting a flow of photo carriers in response to the absorbed light surrounded by regions free of rectifying barriers, insulating means coating said surface selectively at portions overlying regions free of rectifying barriers and leaving exposed portions overlying the rectifying barriers, and a second array of rectifying barriers interposed between those of said first array adjacent said surface and covered by said insulating means, and means to bias the rectifying barriers of said second array independently of said first array of rectifying barriers to direct at least a portion of the flow of photogenerated carriers from the first array to the second array.

PATENTS

GRANTED JUNE 7, 1977

ERRATA

For CLASS	See PATENT NO.
428–623	4,027,366
428–652	4,027,367
040–310	4,027,426
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403–353	4,027,453
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134–010	4,027,685
134–033	4,027,686
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198–719	4,027,793
206–395	4,027,794
206–409	4,027,795
206–507	4,027,796
209–074 R	4,027,797
211–004	4,027,798
211–013	4,027,799
212–014	4,027,800
212–145	4,027,801
214–001 SW	4,027,802
214–001 H	4,027,803
214–001 BV	4,027,804
214–006 G	4,027,805
214–016 R	4,027,806
214–075 R	4,027,807
214–313	4,027,808
214–353	4,027,809
277–188 R	4,027,816
214–038 CA	4,027,823
297–284	4,027,888
280–746	4,027,905
280–751	4,027,906
303–109	4,027,926
350–096 C	4,027,938
425–133.1	4,028,024
428–558	4,028,062
075–233	4,028,061
075–233	4,028,063
428–675	4,028,064
062–101	4,028,078
062–335	4,028,079
071–094	4,028,084
096–114.1	4,028,129
029–623.2	4,028,138
252–313 R	4,028,216

260–314	4,028,217
252–321	4,028,218
250–359	4,028,267
235–089 R	4,028,529
235–144 HC	4,028,530
250–531	4,028,551
361–076	4,028,555
361–220	4,028,590
361–011	4,028,591
361–016	4,028,592
361–027	4,028,593
307–326	4,028,594
361–328	4,028,595
361–235	4,028,596
323–075 B	4,028,642
303–006 C	4,028,658

PATENTS

GRANTED JUNE 7, 1977

GENERAL AND MECHANICAL

4,027,339
HOCKEY GLOVE WITH IMPROVED PALM CONSTRUCTION

Ben B. Brucker, 240 N. Crescent St., Beverly Hills, Calif. 90210

Filed June 17, 1976, Ser. No. 696,985
Int. Cl.² A41D *13/10*
U.S. Cl. 2—16 **5 Claims**

1. In a padded hockey glove comprising: a hollow flexible hand receiving body member formed of seam joined palm and back flexible sheet material portionns including integral thumb and finger stalls at least partially formed by said seamed back and palm sheet material portions, padding carried by said glove body member on the outsdie of the back sheet material including the thumb and finger stall area, the improvement wherein: said palm sheet material portion is formed of waterproofed top grain boar hide, and the thumb stall is formed by a stall back wall waterproofed top grain boar hide strip folded at the middle and stitched at its edges to respective edges of said back sheet material portion and the palm sheet material portion of said glove body member, one end of said folded stall back wall strip being sewn to the thumb stall section of said palm sheet material portion at a point longitudinally inward of the end of that section and the other end of said stall back wall strip being stitched commonly to the end of said thumb stall section of said palm sheet material portion to form a gap between the padded portion of said thumb and the thumb stall to permit the wearer's thumb to flex inwardly and to permit ready grasping of the hockey stick carried thereby.

4,027,340
FACE MASK

Frederick B. Hadtke, New Providence, N.J., assignor to Robert Hain Associates, Inc., Scotch Plains, N.J.

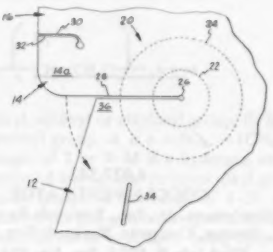
Filed Mar. 15, 1976, Ser. No. 667,267
Int. Cl.² A42B *1/00*
U.S. Cl. 2—206 **17 Claims**

1. A face mask blank comprising:

a flexible sheet material;

lines scored into the surface of said flexible sheet material, outlining thereon two concentric geometric figures of similar shape and outline but of dissimilar size and area in one part of said flexible sheet and two other concentric geometric figures in an adjacent part of said flexible sheet;

and a slit cut into said flexible sheet material from the edge thereof to the common center of said concentric geometric figures, permitting a portion of said concentric geometric figures to be angularly rotated with said common center as a center of rotation to overlap another portion of said concentric geometric figures, the area of a smaller of said concentric geometric figures extending as a cone painting in one direction from said flexible sheet material and the area of a larger of said concentric geometric figures surrounding the area of said smaller concentric

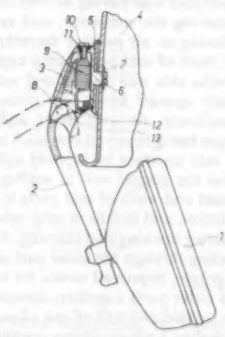


geometric figure extending as a truncated cone pointing in the opposite direction from said flexible sheet material, whereby the flexible sheet material face mask blank is transformed into a three-dimensional configuration having three-dimensional facial characteristic contours.

4,027,341
JUNCTURE ARRANGEMENT BETWEEN THE BOW OF A HEARING PROTECTION MEANS AND A PROTECTIVE HELMET

Matti Patteri, Vantaa, Finland, assignor to Exel OY, Helsinki, Finland

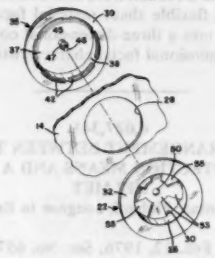
Filed Feb. 12, 1976, Ser No. 657,699
Claims priority, application Finland, Feb. 14, 1975, 750410
Int. Cl.² A42B *3/00*
U.S. Cl. 2—423 **4 Claims**



1. A hearing protection device comprising a protective helmet to be worn by the user of the device, an ear hood, an elongated bow member connecting said ear hood to said protective helmet, a fixing part, a first pivot means provided on said fixing part for pivotally securing said protective helmet for forward and rearward pivotal movement with respect thereto, a second pivot means provided on said fixing part, the upper end of said bow member being mounted on said pivot means to provide lateral movement of said ear hood toward and away from the ear of the user, the upper end of said bow member being provided with an elongated sliding surface extending at a substantial angle to the principal axis of said bow member, a resilient member secured at one end to said

fixing part, a pin mounted on the other end of said resilient member for sliding engagement on the sliding surface of said bow member, whereby when said bow member is pivoted laterally away from the ear of the user, the angle of the sliding surface of said bow member alters with respect to said resilient member causing said pin, under force of said resilient member, to slide over said sliding surface, said pivot means being located between the ends of the sliding surface so that said pin moves from one side to the other of said pivot means and said bow member is resiliently urged to its outer lateral position.

4,027,342
GOGGLE VENTILATOR
Jack B. Hirschmann, Jr., Inc., Buzzards Bay, Mass., assignor to H. L. Bouton, Company, Buzzards Bay, Mass.
Filed July 9, 1975, Ser. No. 594,610
Int. Cl.² A61F 9/02
U.S. Cl. 2—436 **8 Claims**



1. A goggle ventilator for use in a safety goggle frame including an impervious wall having at least one aperture therethrough for receiving the ventilator, said ventilator including an inner part having an air passage therethrough and a separate outer part, both of said parts being cup-shaped and each including a tubular side wall and an end wall, means forming a pair of axially spaced inner and outer annular flanges mounted, respectively, on said inner and outer ventilator parts, said flanges being received one each on each side of the goggle wall at said aperture to support said inner and outer parts directly on the goggle wall in sealing relation with the wall and with said end walls of said parts in generally parallel and aligned relation, and means in said outer part defining at least one ventilating opening therethrough for providing an air passage connecting through the inner part air passage into the interior of the goggle, improved means for securing said ventilator inner and outer parts together, comprising:

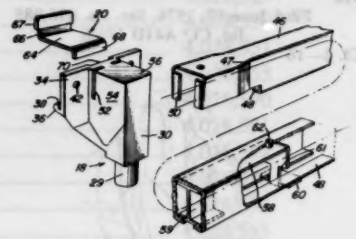
a. a solid pin on said end wall of one of said ventilator parts,

b. means including a pin-receiving opening in said end wall of the other of said ventilator parts dimensioned to receive and hold said pin therethrough in interlocked relation to hold said ventilator parts together, said pin and pin-receiving opening providing for ready assembly of said ventilator onto the goggle with said ventilator flanges clamped firmly thereon and providing resistance against separation of said ventilator inner and outer parts,

c. said parts being proportioned to position said end walls thereof in spaced relation in the assembled position of said ventilator, and

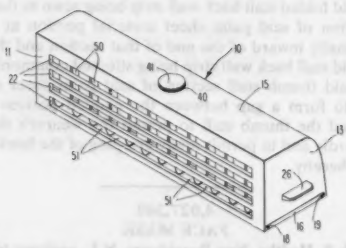
d. one of said end walls being resilient to act as a spring maintaining said flanges in clamping relation with the goggle wall with a force controlled by the degree to which said pin is inserted through said pin-receiving opening.

4,027,343
BED FRAME WITH DETACHABLE AND INTERCHANGEABLE COMPONENTS
Joe B. Hooker, Linwood, N.C., assignor to Metal Bed Rail Company, division of Leggett & Platt, Inc., Linwood, N.C.
Filed Apr. 10, 1975, Ser. No. 567,019
Int. Cl.² A47C 19/00
U.S. Cl. 5—200 R **18 Claims**



1. A bed frame comprising a pair of generally parallel side rails and a pair of generally parallel cross rails oriented in perpendicularrelation to the side rails, a supporting leg assembly adjacent the extremities of the frame, and means detachably connecting the ends of the cross rails to the side rails, said detachable means comprising a pair of laterally extending, spaced, opposed vertical flanges on the end of the cross rail, said supporting leg assembly including a body having a pair of laterally opening, vertically disposed grooves having open upper ends vertically slidably receiving said flanges for rigidly and detachably connecting the cross rail with the side rail.

4,027,344
ENERGY CONSERVING BED WARMING DEVICE
Kyoungsik Pak, 221 Holly Drive, King of Prussia, Pa. 19406
Filed Feb. 23, 1976, Ser. No. 660,064
Int. Cl.² A47G 23/00
U.S. Cl. 5—347 **9 Claims**



1. A portable energy conserving warming device for use in a bed comprising:

a. a hollow container of heat conductive material to provide a closed reservoir of heated fluid,

b. said hollow container having spaced front and rear walls and spaced top and bottom walls, and spaced side walls each connected to said front, rear, top and bottom walls,

c. an opening in the container to permit heatable fluid to be deposited in and removed from the container,

d. a closure for the opening,

e. a hollow casing of heat insulating material for snugly enclosing the container.

f. said casing including spaced front and rear walls connected by spaced side walls, and having a lid,

g. the front, rear and side walls of the casing being disposed, respectively, proximate of the front, rear and side walls of

the container, when the container is enclosed within the casing,

h. a plurality of openings disposed in one wall of the casing for permitting heat to radiate gradually from heated fluid in the container to the ambient atmosphere and

i. a plurality of spaced indentations formed in at least one wall of the container, to enhance the radiation of heat from the heated fluid in the container to the casing wall openings,

j. said indentations being disposed adjacent said casing wall openings.

4,027,345
TRANSFER PRINTING

Michio Fujisawa; Hatsuo Matsumoto; Shuzo Sawada; Kiyoshi Yamane, all of Otsu; Hideo Kato, Kashiwara; Takayuki Shimizu, Habikino, and Shigeo Kato, Kashiwara, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed June 12, 1975, Ser. No. 586,281

Claims priority, application Japan, June 14, 1974, 49-68439

Int. Cl.² D06P 5/00; C08L 1/32, 91/00

U.S. Cl. 8—2.5 R **12 Claims**

1. In a method of transfer printing which comprises forming a release layer on a temporary support; printing a pattern on said release layer with an ink containing coloring matter therein to obtain a transfer sheet; superposing an article to be transfer-printed on the printed surface of said transfer sheet; heating the superposed aggregate under pressure to transfer the release layer with the pattern onto said article to be transfer-printed; fixing the coloring matter to said article, and then soaping said article to remove the release layer; the improvement wherein the release layer consists essentially of

1. 10 to 90 weight percent of one or more thermoplastic polymers having excellent film-forming properties, water-solubility or alkaline water-solubility and organic solvent-solubility and having a softening point of between 60° and 200° C, said polymers being selected from the group consisting of hydroxypropyl cellulose, hydroxypropyl-hydroxyethyl cellulose, hydroxypropyl-methyl cellulose phthalate, hydroxypropyl-hydroxyethyl cellulose phthalate and vinyl copolymers consisting of an ethylenically unsaturated mono- or dicarboxylic acid and another ethylenically unsaturated monomer copolymerizable therewith and,

2 90 to 10 weight percent of one or more water-soluble or alkaline water-soluble and organic solvent-soluble oxycarboxylic acids and derivatives as plasticizers having a melting point between 30° and 120° C, said plasticizer being selected from the group consisting of 12-hydroxystearic acid, 2-hydroxypalmitic acid, 11-hydroxypalmitic acid, 14-hydroxypalmitic acid, 16-hydroxypalmitic acid, 2-hydroxytetradecanoic acid, 11-hydroxytetradecanoic acid, 2-hydroxydodecanoic acid, ω-hydroxylauric acid, 3,11-dihydroxytetradecanoic acid and 9,10-dihydroxyundecanoic acid.

4,027,346
POLYESTER FIBER TREATED WITH ANIONIC POLYALKYLENE OXIDE EMULSIFIED POLYESTER POLYETHER FINISH

Masahiro Wada, Moriguchi, and Masakazu Date, Takatsuki, both of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

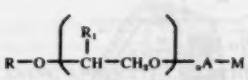
Filed Apr. 23, 1975, Ser. No. 570,962

Claims priority, application Japan, Aug. 21, 1974, 49-96570

Int. Cl.² D06P 1/613

U.S. Cl. 8—30 **19 Claims**

1. A method for modifying polyester synthetic fiber products, comprising the steps of dipping said fiber products in a treating liquor having an aggregation initiating temperature in the range of 65°–125° C and then heating said treating liquor to 100° C to 140° C and to temperatures at least 1° C higher than its aggregation initiating temperature to thereby heat said fiber products, said treating liquor being prepared by adding to an aqueous dispersed liquid of a polyester polyether block copolymer, which is prepared from an aromatic dicarboxylic acid or a lower alkyl ester thereof, a lower alkylene glycol and a polyalkylene glycol, (a) an emulsifying amount of a surface active agent as expressed by the following general formula (I):



(I)

where; R is an alkyl, alkenyl or alkylaryl group; R_1 is a hydrogen atom or a methyl group; A is a $—SO_3$, $—(CH_2)_mSO_3$ or PO_3, *m* is an integer of 2 or 3; M is a hydrogen atom or an ammonium, substituted ammonium or lower alkyl group or an alkali metal; *n* is an integer in the range of 4–20 and (b) a member selected from the group consisting of at least one acid or latent acid which forms an acid upon being hydrolyzed, at least one water-soluble salt and mixtures thereof, said salt being made up of cations selected from the group consisting of NH_4^+, Na^+, Li^+, K^+ and Mg^{++} and anions selected from the group consisting of SO_4^{--}, CH_3COO^-, Cl^- and Br^-, said member being used in an amount to increase the affinity and sorption power of said block copolymer to the polyester synthetic fiber products, and in cases wherein a water-soluble salt is used, said salt being also used in salting out proportions.

4,027,347
SWIMMING GLOVE

Haruto Sato, Daini Sakuraso, 49-10 Nishikubo 1-Chome, Musashino, Tokyo, Japan

Filed Aug. 4, 1976, Ser. No. 711,696

Claims priority, application Japan, May 21, 1976, 51-64790[U]

Int. Cl.² A63B 31/04

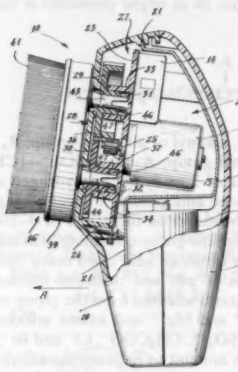
U.S. Cl. 9—308 **5 Claims**

1. A swimming glove comprising an elastic and sealable hollow main body which integrally includes a hollow palm portion, a plurality of spaced hollow finger portions extending radially and outwardly of said palm portion and plurality of foldable finger-webs each extending between adjacent ones of said finger portions; a binding member applied about the carpus end of said palm portion for sealingly tightening the glove to one hand of the wearer; a plurality of spaced rockable water resisting pieces secured on one side to one side of said palm portion and one of said hollow finger portions; a first plurality of spaced rigid restraining pieces disposed adjacent to one side of said water resisting pieces for limiting the movement of said resisting pieces in one direction; and a second plurality of spaced rigid restraining pieces disposed adjacent to the other side of said water resisting pieces for limiting the movement of said water resisting pieces in the other direction.

4,027,348
SKIN TREATMENT APPLIANCE

Theodore Robert Flowers, New Haven, and Hermann Reinhold Schaefer, Bridgeport, both of Conn., assignors to Sperry Rand Corporation, Bridgeport, Conn.

Filed Jan. 12, 1976, Ser. No. 648,508
Int. Cl.² A46B 13/02
U.S. Cl. 15—22 R 13 Claims

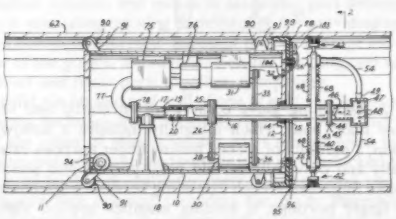


1. A skin treatment attachment for a portable electrical skin treatment appliance having a motor and rotary drive means for operating the attachment, the attachment comprising;
a. a casing containing skin treatment output means,
b. means detachably connecting said casing to the appliance,
c. rotable cam means within the casing,
d. means for connecting said cam means to the appliance drive means,
e. means for directing movement of the casing upon operation of the rotary drive means, and
f. means within the casing for converting motion of the rotatable cam means to orbital motion of the skin treatment output means.

4,027,349
APPARATUS FOR BRUSH-CLEANING THE INTERIORS OF PIPES

Edward Albert Clavin, Houston, Tex., assignor to Midcon Pipeline Equipment Co., Houston, Tex.

Filed Mar. 12, 1976, Ser. No. 619,702
Int. Cl.² B08B 9/02
U.S. Cl. 15—104.12 31 Claims

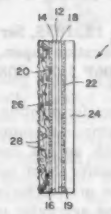


1. Apparatus for brush cleaning the inner side of the wall of a pipe, comprising body means adapted to be received in a pipe, rotative means supported by said body means adapted for rotation coaxially of said pipe, a plurality of brushes circularly spaced around the outer periphery of said rotative means and mounted for rotation about an axis directed toward the wall of the pipe, gas motor means for rotating each said brush about its said axis, said rotative means having flow passage means for delivering gas from a non-rotative source carried by said body means to said gas motor means to operate said gas motor means, said axis of each said brush being disposed at a small forward angle from a direction radially of said rotative means with respect to the direction of rotation of said rotative means whereby the leading edge of each said brush bears against the pipe wall with less pressure than the trailing edge of the brush and thereby reducing brush wear, and including means for biasing each brush toward the pipe wall.

4,027,350
CLEANING PAD

Ervin Kotche, Orlando, Fla., assignor to Ervin H. Kotche, Orlando, Fla.

Filed Apr. 29, 1976, Ser. No. 681,391
Int. Cl.² A47L 13/17
U.S. Cl. 15—104.93 2 Claims



1. A buffing pad, which comprises:
a. a steel wool layer;
b. a layer of polyethylene having a front and a rear surface;
c. a first paper layer mechanically bonded to said front surface of said polyethylene layer, said first paper layer adhesively secured to said steel wool layer;
d. a solution of crude drying oil and essence of lemon, said solution impregnated into said steel wool layer;
e. a second paper layer mechanically bonded to said rear surface of said polyethylene; and
f. a dust cloth layer, said dust cloth adhesively secured to said second paper layer.

4,027,351
BRUSH CONSTRUCTION

Frank Marino, Baldwin, N.Y., assignor to The Wooster Brush Company, Wooster, Ohio

Filed Feb. 9, 1976, Ser. No. 656,531
Int. Cl.² A46B 3/02
U.S. Cl. 15—192 6 Claims

1. A brush, comprising:
bristle-like means for applying fluid-like material or the like to a surface, said bristle-like means having opposite end portions;
a longitudinally extending ferrule having a generally tubular wall extending substantially parallel to the longitudinal axis of said brush and terminating at opposite ends, a

raised generally annular bead extending peripherally and circumferentially about said ferrule in said tubular wall at a location between said ends and generally perpendicularly to the longitudinal extent of said ferrule, said bead having a generally rectangular cross-sectional profile, one wall of said bead being generally parallel to the longitudinal extent of said ferrule, said ferrule including a generally tubular skirt portion between said bead and one of said ends thereof;

one end portion of said bristle-like means providing a hold which is positioned within the volume in said ferrule circumscribed at least in part by said skirt portion and part of said bead, the inner extremities of said hold terminating intermediate the longitudinal ends of said bead, and the remainder of said bristle-like means extending externally of said ferrule beyond said one end thereof,

said bead having a sufficiently large cross-sectional profile and circumscribing a volume having a cross-sectional area sufficiently larger than the cross-sectional area of the volume circumscribed by said skirt portion to permit expansion of the part of said hold located within such larger cross-sectional area volume partially filling the volume of said bead thereby increasing the effective porosity of said bristle-like means at said hold to permit liquid adhesive means to more thoroughly permeate said hold; and

hardenable adhesive means in said ferrule appreciably permeating into engagement with said hold and substantially filling the remaining available volume circumscribed by said bead for securing said bristle-like means to said ferrule, said hardenable adhesive means permeating between said hold and the interior wall of said bead to form an annular flange of hardened adhesive means within said annular bead to lock said hold in place.

4,027,352

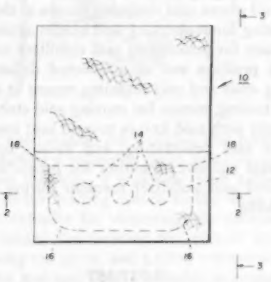
SCOURING PAD WITH RETAINED CONTOURED STIFFENER

Walter Wagner, 2 Spring Drive, Dumont, N.J. 07628

Filed July 22, 1976, Ser. No. 707,638

Int. Cl.² A47L *17/08*

U.S. Cl. 15—209 C **7 Claims**



1. A plastic scouring pad for pots, pans and the like in which the pad is made of a size sufficiently small to be easily folded for hand manipulation, the outer surface of the pad being sufficiently open and abrasive to clean unwanted debris from the surfaces of said pots, pans and the like, said scouring pad including: (a) an outer member of a selected thickness of at least ⅛ inch and of a generally rectangular configuration and of a plastic, non-woven, fibrous open construction for the scouring of the surface of said pots, pans and the like, and (b) an insert of stiff plastic sheet material which is at least one-sixteenth of an inch thick and is impervious to the effect of water and detergents during its period of use, the insert being generally rectangular and having at least one corner formed with a radius and at least one of the other corners formed with a substantially 90 degree sharp configuration, said insert secured as an internal member within a fixed foldover end portion of the outer member to provide a double thickness, said end portion of the outer member completely enclosing the faces and all edges of the insert to provide at least three-sixteenths of an inch border of the outer member around the insert, the outer member also being constructed so as to provide an attached free end portion extending for at least one and one-third times the length of the double thickness portion of the outer member, the attached free end providing means for said free end to be brought to and around the double thickness to provide an additional thickness of scouring material at the edges and corners of the insert.

4,027,353

CLEANING APPARATUS, PARTICULARLY FOR CLEANING WINDOW PANES

Henry Morton Unger, No. 9, Lotharstrasse, 565 Solingen, Germany

Filed June 4, 1976, Ser. No. 692,716

Claims priority, application Germany, June 6, 1975, 2525201; Dec. 20, 1975, 2557768

Int. Cl.² A47L *1/06*

U.S. Cl. 15—245 **2 Claims**

1. A cleaning apparatus, particularly for cleaning window panes, fitted with a replaceable strip-shaped rubber wiping element (5) having front, rear and side edges, a U-section holding sheath (6) accommodating the rear edge of the wiping element and, at the forward end of a handle for holding the cleaning apparatus, two clamping plates (2, 3) of which one is detachable and secures the wiping element in its holding sheath, the detachable clamping plate being formed at its transverse front edge with an inwardly and rearwardly directed tapering lip (7) which curls over the front edge of one side of the holding sheath and bears against the wiping element, and which is provided on its outside flank with rib-like teeth (8) extending transversely to the longitudinal axis of the lip, the teeth biting into the wiping element.

4,027,354

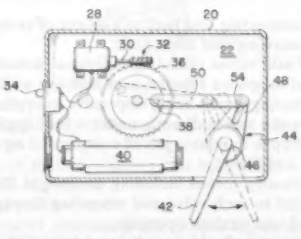
DETACHABLE WINDSHIELD WIPER ASSEMBLY FOR HELMET

Louis W. Burpee, Spencer Road, Whitefield, N.H. 03598

Filed Dec. 1, 1975, Ser. No. 636,819

Int. Cl.² B60S *1/24*

U.S. Cl. 15—250.3 **9 Claims**



1. A detachable windshield wiper assembly for a helmet having a front visor comprising:

a housing including a rear wall contoured so as to be

brought into detachable close engagement with the front wall of a helmet, said rear housing wall having fastening means associated therewith for detachable connection with cooperable fastening means on the front wall of the helmet;

motor means positioned within said housing including an output shaft;

a worm gear carried by the output shaft of said motor means;

a pinion mounted within said housing drivable by said worm gear;

a pivotable element mounted within said housing including a shaft and a radially extending lever arm carried thereon having a radially extending elongated slot therein, said pivotable element being drivable by said pinion to be oscillated thereby through a predetermined arc;

a connecting rod pivotably connected at one end thereof to said pinion and at the other end thereof to said lever arm so as to slide within said slot;

an oscillatable wiper arm connected integrally to said pivotable element and projecting through an opening in a lower portion of said housing, said oscillatable wiper arm carrying thereon a windshield wiper blade;

and means carried by said housing for selectively powering said motor means.

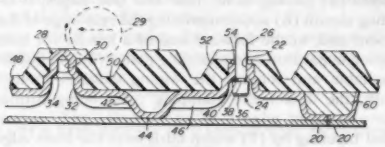
4,027,355
PNEUMATIC CLEANING MAT AND METHOD OF MAKING SAME

George N. J. Mead, 22 Emerald Acres, Dover, N.H. 03820, and Philip R. Corneliusen, Black Pond Road, Hillsboro, N.H. 03244

Continuation-in-part of Ser. No. 425,543, Dec. 17, 1973, abandoned. This application Jan. 27, 1975, Ser. No. 544,563

Int. Cl.² A47L 23/22, 5/38

U.S. Cl. 15—310 10 Claims



1. A pneumatic cleaning mat, comprising

a. a generally flat, shallow tank having closely spaced top and bottom walls,

b. said top wall being formed with a plurality of spaced openings therein in a first horizontal plane,

c. a valve movably mounted in each of said openings for normally closing said openings,

d. a tread stratum disposed over said top wall and formed with a plurality of openings in registration with said top wall openings, said stratum including a tread surface disposed in a second horizontal plane above said first plane,

e. means connecting said tank to a source of compressed air for pressurizing said tank, and,

f. each of said valves including individual actuating means disposed in spaced relation over said top wall,

g. said actuating means being responsive to applied pressure whereby the valves directly under a foot applied to said mat will open to release jets of compressed air against the sole of said foot,

h. said actuating means including an upright flexible stem connected to each valve and extending through said top wall and said stratum openings,

i. the upper end of said stem being substantially flush with the upper surface of said stratum and a second stratum of relatively soft resilient material disposed between the first stratum and said top wall and adapted to yield under applied weight.

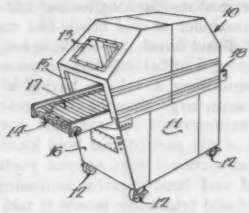
4,027,356
MEAT TENDERIZER

Richard C. Wagner, Frankfort, and Ronald A. Banike, Orland Park, both of Ill., assignors to Hollymatic Corporation, Park Forest, Ill.

Filed Oct. 29, 1975, Ser. No. 626,757

Int. Cl.² A22C 9/00

U.S. Cl. 17—25 11 Claims



1. Apparatus for tenderizing meat, comprising: a conveyor for the meat; a plurality of knives each comprising an elongated blade having opposite ends one of which comprises a sharp cutting end for penetrating the meat and severing toughening fibers and tissues in the meat into short pieces; means for reciprocating said knives for projecting and withdrawing said blades into and from meat on said conveyor, each blade being subject to lateral bending between said ends under stress of the type resulting from resistance to said penetrating; a meat retaining means engaging the top of the meat and through which said blades extend; locking means for locking said retaining means against the meat during said withdrawing; means for thereafter releasing said locking means and thus said retaining means from said meat; a blade stabilizer means in addition to said meat retaining means comprising a stabilizer member engaging each of said blades intermediate said blade ends and above said retaining means at the beginning of said penetrating for supporting said blades against said lateral bending; means for positioning said stabilizer member at said intermediate position and at a selected distance from said blade cutting ends and said retaining means at said beginning of said penetrating; means for moving said stabilizer member simultaneously with said knives toward said meat during said beginning of said penetrating; and means for halting said moving of said stabilizer member for projecting said blades further beyond said stabilizer member during completion of said penetrating.

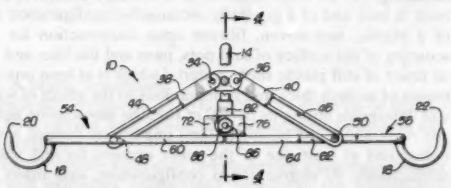
4,027,357
COLLAPSIBLE DRESSING HOOK FOR ANIMALS

Florin V. Morris, Taft, Calif., assignor to Howard E. Caywood, Taft, Calif., a part interest

Filed Jan. 19, 1976, Ser. No. 650,506

Int. Cl.² A22B 1/00; A22C 15/00

U.S. Cl. 17—44 8 Claims



1. A collapsible dressing hook for animals comprising:

a member adapted to be engaged and supported to hang vertically from above,
a pair of oppositely outwardly extending arms having inner and outer ends,
the arms being hinged to said member adjacent their inner ends,
said arms being adapted to be hingedly moved on said member from an outwardly extending position to a substantially vertical collapsed position,
animal impaling hooks on the outer ends of said arms, and
an arm support for each arm, each arm support having outer and inner ends,
each arm support being pivotally connected adjacent its inner end to said member above the inner ends of said arms,
each arm support being connected adjacent its outer end to a respective arm intermediate its ends to support the arm in the outwardly extending position,
the connection of each arm support to the respective arm being slidable to permit the arms to move to their collapsed substantially vertical position from the extended position.

4,027,358

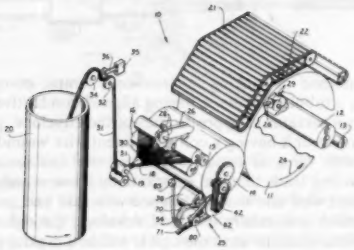
VARIABLE SPEED DRIVE SYSTEM FOR CARDING MACHINE

Lorenzo Llach, Marietta, and Arturo Picas, Athens, both of Ga., assignors to Canton Textile Mills, Inc., Canton, Ga.

Continuation-in-part of Ser. No. 545,195, Jan. 29, 1975, Pat. No. 3,982,301. This application Aug. 18, 1975, Ser. No. 605,635

Int. Cl.[2] D01G *15/46*

U.S. Cl. 19—106 R **5 Claims**



1. In a textile card system for working and forming cotton into a sliver including a rotatable main cylinder, a motor for rotating the main cylinder, a rotatable feed cylinder and a rotatable licker-in for feeding cotton to the main cylinder, a rotatable doffer cylinder for removing the cotton from the main cylinder, means for forming the cotton into a sliver, means for receiving the sliver, and a drive connection between said feed cylinder and said doffer cylinder to rotate said feed cylinder and doffer cylinder at a fixed speed ratio, the combination therewith of a variable speed drive system including a motor, a variable pitch drive pulley driven by said motor, a variable pitch driven pulley in driving connection with said doffer cylinder, a V-belt extending about said drive pulley and said driven pulley, means for varying the pitch of one of said pulleys and for varying the pitch of the other of said pulleys at a pitch inversely proportional to the pitch of said one of said pulleys, limiting means for variably limiting the pitch of said pulleys to variably limit the speed of said doffer cylinder and said feed cylinder and control means for sensing the sliver between the card system and the sliver receiving means for stopping the rotation of said doffer cylinder and said feed cylinder in response to the absence of a sliver being delivered from said card system to the sliver receiving means and for actuating said means for varying the pitch of one of said pulleys to increase the rotational speed of said doffer cylinder and said feed cylinder in response to the delivery of a sliver from said card system for a predetermined time at a slower speed.

4,027,359

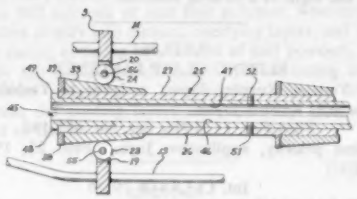
WIRE COME-ALONG

Kenneth Dale Tinker, P.O. Box 1123, Flagstaff, Ariz. 86001

Filed Oct. 28, 1975, Ser. No. 626,087

Int. Cl.[2] F16G *11/00*; **F16B** *11/00*

U.S. Cl. 24—115 R **10 Claims**



1. A wire come-along for applying tension to a cable, said wire come-along comprising:
a. a split sleeve having a pair of hinged sleeve sections for encirclingly receiving the cable;
b. a frame for receiving said split sleeve;
c. a plurality of pairs of opposed bearing surfaces attached to said frame for accommodating relative movement of said frame with respect to said split sleeve; and
d. a plurality of pairs of opposed wedges extending from said split sleeve and bearing against respective ones of said bearing surfaces for generating a clamping force upon the cable disposed within said split sleeve in response to relative longitudinal movement between said frame and said split sleeve; whereby, a longitudinally directed force applied to said frame causes the cable to become clamped within said split sleeve and places the cable in tension.

4,027,360

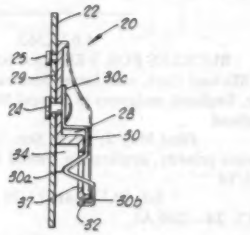
TIE DOWN BRACKETS FOR SECURING BIGHTS OF FLEXIBLE MEMBERS

Willard W. Moser, P.O. Box 1503, Guymon, Okla. 73942

Continuation-in-part of Ser. No. 431,205, Jan. 7, 1974, Pat. No. 3,889,321, and a continuation-in-part of Ser. No. 564,806, April 3, 1975, Pat. No. 3,973,298. This application Apr. 27, 1976, Ser. No. 680,761

Int. Cl.[2] A43C *3/00*; **B21D** *53/46*

U.S. Cl. 24—146 **6 Claims**



1. A tie down bracket, comprising:
a base plate;
a spring-supporting body secured to said base plate and including:
a flat back surface abutting said base plate;
a dished-out portion;
a central portion; and
an apertured retainer finger projecting as a cantilever from said central portion or the opposite side thereof from said dished-out portion and extending parallel to said base plate and spaced therefrom; and

an elongated spring plate having:

a first end secured to said spring supporting body in the dished-out portion thereof and on the opposite side thereof from said flat back surface;

a second end hooked over the free end of said retainer finger; and

a V-shaped portion between said ends projecting through the aperture in said retainer finger and defining with said base plate and with the central portion of said spring supporting body, a retainer space for retaining the bight of a flexible member.

4,027,361

SLIDING CLASP FASTENER

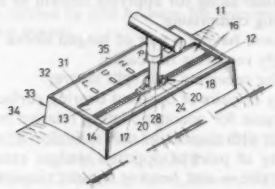
Kiyoo Yoneya, Kurobe, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Feb. 11, 1976, Ser. No. 657,181

Claims priority, application Japan, Feb. 21, 1975, 50-24712[U]

Int. Cl.² A44B *19/26*

U.S. Cl. 24—205 R **1 Claim**



1. In combination, a base means having a slot; a sliding clasp fastener connected to said base means to cover said slot, said sliding clasp fastener having interengageable rows of fastener elements and a pair of sliders moveable along said rows of fastener elements to engage and disengage same to establish a limited length moveable open gap in the sliding clasp fastener along which gap the fastener elements are disengaged, and beyond said gap the fastener elements being engaged, each of said sliders having an open bail; a retainer loop member extending through the bail of each slider to keep said sliders in a spaced-apart relation to determine the size of said gap, but allow limited relative movement of said sliders; and a moveable bar member extending through said gap and retainer loop member, said bar member being moveable along the direction of said rows of fastener elements and disposed for engagement with a contact surface on at least one of said loop member and sliders to correspondingly establish the location of said gap.

4,027,362

BUCKLES FOR VEHICLE SAFETY BELTS

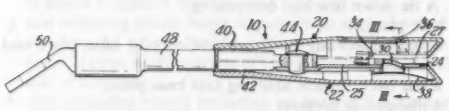
John Michael Hart, and James Shadrach Varah, both of Carlisle, England, assignors to Kangol Magnet Limited, London, England

Filed May 2, 1975, Ser. No. 574,108

Claims priority, application United Kingdom, May 2, 1974, 19425/74

Int. Cl.² A44B *11/26*, *17/00*

U.S. Cl. 24—230 AL **7 Claims**



1. A buckle for a vehicle seat belt system, the buckle comprising a tongue portion having a latch formation, a socket portion, wall means in said socket portion defining a socket having a mouth through which said tongue portion can be inserted into said socket, an aperture in said wall means, and a latch means having a latch portion, the latch means extending around said wall means and being movable relative thereto between a latching position in which said latch portion extends into said socket through said aperture for engagement with said latch formation when said tongue portion is received in the socket, whereby the tongue portion is retained within the socket, and a release position in which the tongue portion can be withdrawn from the socket, means biasing said latch means into the latching position, surfaces formed on said wall means, the surfaces extending transversely of the direction of movement of said tongue and facing away from said mouth, surfaces on said latch means extending transversely of the direction of movement of said tongue for engagement with said wall means surface, said wall means comprising a plate having the aperture, and integral side walls curving upwardly from respective opposed edges of the plate and then towards each other to define the socket, cut-outs in said side walls providing said surfaces.

4,027,363

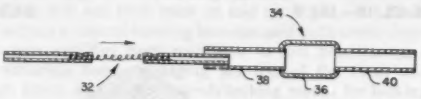
METHODS OF MAKING INCANDESCENT LAMPS

Donald J. Belknap, P.O. Box 325, Mountain Home, N.C. 28758

Division of Ser. No. 372,535, June 22, 1973, Pat. No. 3,914,640, which is a division of Ser. No. 147,747, May 28, 1971, Pat. No. 3,762,900. This application Aug. 8, 1975, Ser. No. 603,158

Int. Cl.² H01K *1/18*

U.S. Cl. 29—25.15 **4 Claims**



1. A method of making incandescent lamps, comprising providing a tubular envelope having aligned conductive tubular terminal sections at opposite ends of the envelope, providing a filament unit having a coil of filament wire wound about an axis with turns at opposite ends of the coil secured to corresponding leads that are substantially more massive than the filament wire and that are aligned with said axis, inserting said filament unit axially into said envelope through one of said terminal sections until the coil is within a central portion of said envelope and said massive leads are in said terminal sections respectively, and mechanically pinching off said terminal sections through said leads to seal the envelope and to grip the leads of the filament unit, said leads being tubular and said filament unit being provided by inserting a plurality of turns at each end of said coil of filament wire into a corresponding end of a tubular lead and mechanically deforming each lead laterally inward toward said axis sufficiently to indent the tubular lead at a localized region thereof and compress the adjacent turns until the lead and the coil are joined mechanically and electrically.

4,027,364

METHOD OF MAKING A CHAIR LEG BASE

Charles W. Saam, Ohio City, Ohio, assignor to Harter Corporation, Sturgis, Mich.

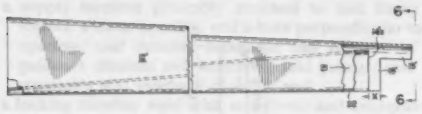
Filed Apr. 5, 1976, Ser. No. 673,312

Int. Cl.² B21D *51/16*

U.S. Cl. 29—150 **4 Claims**

1. The method of making a tapered tubular chair leg, comprising the steps of providing a preformed tube of uniform cross section througout its length having top, bottom and side walls, deforming said bottom wall and adjoining side wall portions inwardly and angularly of said tube to produce a

longitudinally tapered tube having one end smaller than the other and an interior rib which is inclined with respect to the



longitudial axis of the tube, and forming a closed end wall at the smaller end of said tube.

4,027,365

METHOD FOR REMOVING AND RE-INSTALLING THE CRANK-SHAFT OF AN INTERNAL COMBUSTION ENGINE AND DEVICE FOR CARRYING OUT THE SAID METHOD

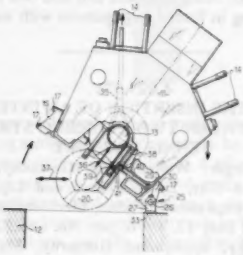
Jacques Ernest Maurice Froeliger, Le Blanc Mesnil, France, assignor to Societe d'Etudes de Machines Thermiques, Saint Denis, France

Filed Aug. 15, 1975, Ser. No. 605,078

Claims priority, application France, Aug. 26, 1974, 74.29163

Int. Cl.² B23P *15/00, 7/00;* **F02F** *7/00*

U.S. Cl. 29—156.4 R **6 Claims**



1. A method for removing or reinstalling the crankshaft of an engine, said engine having a frame mounted on a base by fastening and support means, the crank-shaft having bearing caps and being located in said frame comprising the steps of releasing the frame fastening means, rotating the entire frame including said crankshaft about an axis substantially parallel with the center-line of the crankshaft, removing the crank-shaft bearing caps, and while the frame is in the rotated position, extracting the crankshaft from below the engine by supporting the crank-shaft and allowing the crankshaft to be moved by gravity along a slanted guiding means until the crankshaft reaches the level of the base.

4,027,366

MULTILAYER COATED SUBSTRATE

John M. Millar, Joppa, and William F. Moran, Randallstown, both of Md., assignors to Beatrice Foods Co., Chicago, Ill.

Continuation of Ser. No. 384,895, Aug. 2, 1973, abandoned, which is a division of Ser. No. 107,559, Jan. 18, 1971, Pat. No. 3,770,482. This application May 9, 1975, Ser. No. 576,111

Int. Cl.² B23P *3/00;* **B32B** *7/02, 15/08*

U.S. Cl. 428—623 **10 Claims**

1. An article of manufacture consisting essentially of a conductive substrate and, adjacent and overlying said conductive substrate, a coating comprising a plurality of superimposed, distinct layers,

the layer next to the conductive substrate consisting essentially of a layer of conductive metal selected from the group consisting of iron, stainless steel, zinc, copper, nickel, tin, chromium, brass, titanium, zirconium, lead and alloys of these metals,

at least one of said layers consisting essentially of at least one first film-forming non-conductive organic or inorganic polymer,

the specific gravity of said conductive metal being at least three times that of said first polymer,

said coating being applied to said conductive substrate in one step by electrostatically applying an admixture of powders, said admixture including powders having average particle sizes less than 50 microns of said conductive metal and powders having average particle sizes of about 10 to 300 microns of said first polymer, whereby said powders stratify into distinct, overlying layers, and thereafter curing or fusing at least one of said powders,

whereby the superimposed layers of the coating exhibit improved adhesion as compared to similar articles wherein the coating layers are separately applied and cured or fused.

4,027,367

SPRAY BONDING OF NICKEL ALUMINUM AND NICKEL TITANIUM ALLOYS

Henry S. Rondeau, 2865 Coventry Road, Shaker Heights, Ohio 44120

Filed July 24, 1975, Ser. No. 598,822

Int. Cl.² B05D *1/08;* **B32B** *15/04, 15/20*

U.S. Cl. 428—652 **17 Claims**

1. A method of thermal spraying a substrate to deposit a self-bonding coating on such substrate, comprising supplying an electric arc thermal spray gun with a wire feed comprising an alloy of nickel and aluminum or titanium, and using such electric arc thermal spray gun, spraying said wire feed onto such substrate to coat the same thereby to establish a diffusion bond between such coating and such substrate to provide a self-bonding coating on such substrate.

4,027,368

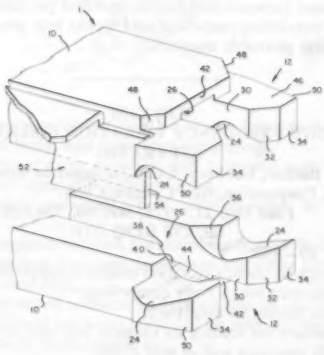
FORCEPS TOOL FOR WIRE INSERTION

John Carl Asick, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed June 22, 1976, Ser. No. 698,670

Int. Cl.² H01R *43/04*

U.S. Cl. 29—751 **4 Claims**



1. A forceps insertion tool, comprising:

a pair of leaf spring arms connected together at respective one ends and diverging toward respective free ends which are provided thereon with wire gripping jaws, inner surfaces of the jaws having wire gripping surfaces for gripping a wire therebetween, said wire gripping surfaces being bifurcated by corresponding channels which receive therein a slotted plate type electrical contact for

connection with a wire gripped between said jaws, said jaws having curviform recesses at the intersection of said said channels with said wire gripping surfaces providing clearances for a curviform portion of said wire resulting from deformation of said wire upon insertion of said wire into said contact.

4,027,369

ELEMENT ROWS COUPLING TOOL FOR A CONCEALED SLIDE FASTENER

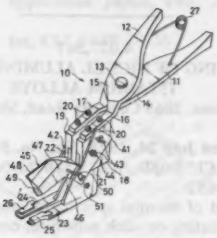
Akiyoshi Kando, Uozu, and Ryoichi Kindai, Toyama, both of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Oct. 15, 1976, Ser. No. 732,854

Claims priority, application Japan, Oct. 23, 1975, 50-127679

Int. Cl.² B23P *19/04*

U.S. Cl. 29—766 **7 Claims**



1. A tool for interengaging a pair of element rows in a concealed type slide fastener, comprising:

a. a pair of blocks movable toward and away from each other and normally urged apart;

b. a pair of slider body halves mounted on said blocks, respectively, said slider halves being matable to provide a slider body when said blocks are moved toward each other;

c. a pivotable member operatively connected to said blocks and having centrally on its bottom surface an element guide, said pivotable member being movable pivotally into a position in which said element guide and said slider body halves are put together and jointly provide a slider when said blocks are moved toward each other; and

d. means between said blocks and said pivotable member for converting motion of said blocks into pivotal motion of said pivotable member.

4,027,370

HIGH FREQUENCY VIBRATION INSERTION APPARATUS

John J. Bachar, Danbury, Conn., assignor to Branson Ultrasonics Corporation, New Canaan, Conn.

Filed Oct. 21, 1976, Ser. No. 734,616

Int. Cl.² B23Q *7/10*

U.S. Cl. 29—818 **11 Claims**

1. A high frequency vibration insertion apparatus for inserting an element into a body comprising:

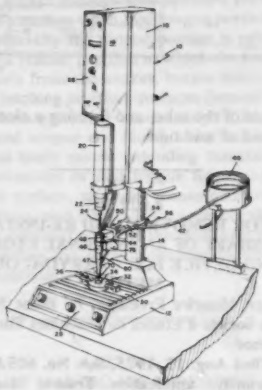
a guide having an axial bore;

feed means for feeding an element into said bore toward a body engaging end of said guide;

means disposed in said bore for retaining an element fed from said feed means in said bore and in proximity to said body engaging end;

a resonator dimensioned to be resonant as a half wavelength resonator at a predetermined high frequency disposed for reciprocating motion within said bore and to engage with one end surface thereof an element fed into said bore and retained therein;

electroacoustic converter means coupled to the other end surface of said resonator for causing, when said converter means is energized, said resonator to be resonant, and force means coupled for causing an element retained in said



bore to be forced out of said bore and driven into a body disposed opposite said body engaging end responsive to said resonator being resonant and said one resonator end surface being in forced engagement with such element.

4,027,371

DEVICE FOR THE INSERTION OF AN INTERMEDIATE MEMBER BETWEEN TWO CROSSING STRINGS OF A TENNIS RACQUET

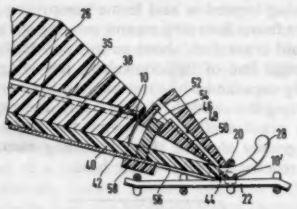
Gebhard Dischinger, Wolfenweiler, Germany, assignor to Babolat-Maillot-Witt, Lyon, France and Lipa Lizenz-und Patentverwertungs-ansalt, Vaduz, Liechtenstein

Filed May 12, 1976, Ser. No. 686,225

Claims priority, application Germany, May 16, 1975, 2521855

Int. Cl.² B23Q *7/10*

U.S. Cl. 29—811 **25 Claims**



1. A device for the insertion of a plurality of intermediate members between respective pluralities of cross-over locations of strings of a tennis racket wherein each of the intermediate members in a cross-over guidance member formed with first and second pairs of projecting members disposed at right angles to one another, each of said pairs partly surrounding one of the strings, comprising:

a frame having a handle portion and supply-storage means for the intermediate members, said frame having a front end and two fork-shaped prongs disposed on said front end for separating the crossing strings, including a location between said prongs;

positioning means for positioning the intermediate members;

a guidance channel formed in said frame and having a

plurality of segments, said supply-storage means communicating with said location through said positioning means and through said guidance channel;

a supply member pivotably attached to said frame and formed with an opening, and a bore perpendicular to said opening, said opening being the last segment of said guidance channel and bordering said prongs, said bore traversing said guidance channel; and

a locking member rigid with said frame and engageable in said bore.

4,027,372

SEAL EMPLACEMENT TOOLS

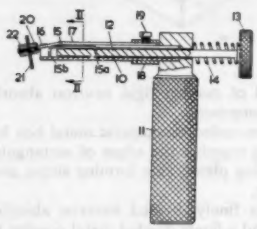
Gordon Charles Mitchell, 82, Hollows Close, Harnham Wiltshire, Salisbury, England

Filed Sept. 3, 1975, Ser. No. 610,056

Claims priority, application United Kingdom, Sept. 3, 1974, 38476/74

Int. Cl.² B25B *27/14*; B23P *19/02*

U.S. Cl. 29—235 **11 Claims**



1. An internal seal emplacement tool for internally emplacing flexible ring seals and including a tube having an open end and for accommodating a folded seal, a plunger in said tube for ejecting the seal from the open end, and a guide externally of and so spaced from said open end as in use to deflect a seal radially outwards from the plunger axis, wherein the guide includes cam means radially deflectable by said plunger towards the end of an ejection stroke thereof, whereby in use a portion of the guide may be located in the designated position for the seal prior to and during most of the ejection of the seal and lifted away from the said designated position just prior to location therein of a final portion of the seal.

4,027,373

FLANGE SPREADER

Theodore Emil Kwast, Anaheim, and Gordon Marion Smith, La Habra Heights, both of Calif., assignors to The Singer Company, New York, N.Y.

Filed July 20, 1976, Ser. No. 707,134

Int. Cl.² B23P *19/04*

U.S. Cl. 29—256 **4 Claims**

1. A flange spreader used for removal of a flow control device mounted between two opposing flanges of a pipeline, the flanges being clamped together by a plurality of studs, a pair of the flange spreaders to clamp the opposing flanges in axially aligned position as replacements for two of the studs and whereby all of the studs will be loosened and some of the studs will be removed to give access to the flow control device, the flange spreader comprising:

a. a pair of members including a jackscrew and a base interconnected to each other to be axially expandable or contractable, and to initially hold the opposing flanges from axial expansion,

b. the jackscrew threadedly connected to a base intermediate the opposing flanges,

c. the base having a portion abutting the inner face of one of the flanges,

d. the base having a threaded shank which extends through the said one flange,

e. a base nut threadedly connected to the shank at the outer face of the said one flange,

f. a jackscrew stop appended to the jackscrew to abut the inner face of the other flange, and

g. a head formed on the jackscrew disposed at the outer face of the said other flange whereby rotation of the jackscrew in one direction will clamp the external faces of the flanges between the head and the base nut thereof to cause axial contraction of the opposing flanges, and rotation in the opposite direction will clamp the inner faces of the flanges between the base and the jackscrew stop to cause axial expansion of the opposing flanges.

4,027,374

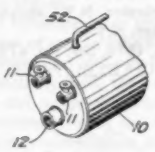
TANK BOTTOM ASSEMBLY APPARATUS

Harry Wayne Rutherford, 1661 Molina Lane, Gardena, Calif. 90247

Division of Ser. No. 484,817, July 1, 1974, Pat. No. 3,914,904. This application Aug. 7, 1975, Ser. No. 602,826

Int. Cl.² B23P *19/04*

U.S. Cl. 29—256 **1 Claim**



1. An apparatus for installing a concave dish into the end of a cylindrical body, said apparatus comprising:

a first pair of cross members and a second pair of cross members, spaced from each other,

brace means connecting both pairs together to form a frame,

a plate disposed between the members of said first pair,

a bar extending from one member to the other member of said second pair,

a crank mounted in threaded relationship on said bar,

one end of said bar being mounted on said one member to pivot on an horizontal axis,

a multioperative apertured member fixed to said other member,

said other end of said bar having a bolt hole adapted so that a bolt can be inserted therethrough to engage one of the apertures in said member to accommodate for different size bodies,

means for mounting said crank on said bar to allow adjustment of said crank, and

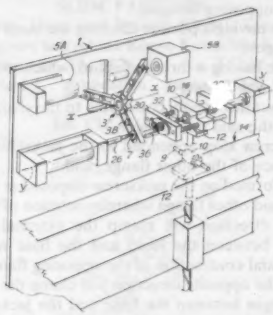
means for indicating when said dish has sufficiently entered said body.

4,027,375

DEVICE FOR ANGULARLY CENTERING A MEMBER HAVING AN ANNULAR TOOTHED FORMATION

Antonio Magni, Lucca, Italy, assignor to Axis S.p.A., Florence, Italy

Filed July 19, 1976, Ser. No. 706,201
Claims priority, application Italy, Aug. 8, 1975, 9513/75
Int. Cl.² B21D *39/04*
U.S. Cl. 29—282 4 Claims



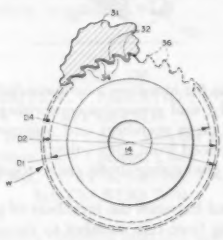
1. A device for angularly centering a member having a toothed formation, said device comprising means defining a grooved seat for slidably receiving the member, and centering means for angularly orientating the member during relative movement between the member and the seat so that the toothed formation can enter the seat, said centering means comprising means defining a ramp, means defining a first profile for centering a tooth which engages the profile, and means defining a second profile for centering a tooth which has engaged the said ramp, the centering means being resiliently deflected by a said tooth engaging the ramp.

4,027,376

METHOD FOR PRODUCING SPARKING WHEELS

Earl W. Brinkman, Rochester, N.Y., assignor to Davenport Machine Tool, Rochester, N.Y.

Filed Apr. 8, 1976, Ser. No. 675,147
Int. Cl.² B23P *17/00*
U.S. Cl. 29—417 5 Claims



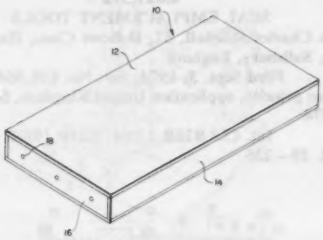
1. A method of producing sparking wheels, comprising
forming on the periphery of a circular wheel blank a plurality of spaced, helical lands which extend diagonally between opposite sides of the blank,
forming the lands on said blank into a plurality of axially and angularly spaced teeth by forcing the blank at least once coaxially into the bore of a broaching tool having angularly spaced cutting surfaces which cut spaced notches transversely across said lands, and
while the blank is still in the bore of said broaching tool and engaged with the cutting surfaces thereof, effecting a slight relative rotation between said blank and said tool so that said cutting surfaces upset the teeth formed in the lands between said notches.

4,027,377

PRODUCTION OF NEUTRON SHIELDING MATERIAL

John J. Roszler, Lincoln Park, Mich., assignor to Brooks & Perkins, Incorporated, Southfield, Mich.

Filed June 25, 1975, Ser. No. 590,206
Int. Cl.² B22F *3/24*
U.S. Cl. 29—420.5 13 Claims



1. The method of making rigid neutron absorbing sheet material which comprises
forming an open-ended rectangular metal box by continuously welding together the edges of rectangular top and bottom forming plates, side forming strips, and one end forming strip,
mixing together finely divided neutron absorbing boron compound and a finely divided metal powder to produce a substantially uniformly dispersed mixture thereof,
positioning the box with its open end up,
completely filling the box with material from the uniform mixture,
jarring the filled box repeatedly to cause the finely divided mixture to settle to eliminate voids or air pockets in the box,
adding material from the mixture as required to ensure that the box is filled,
applying the other end forming strip to the box in solid abutment against the powdered material and providing a continuous weld around its edges to the adjacent end edges of said top and bottom forming plates and side forming strips to produce a composite ingot suitable for rolling,
soaking the ingot to bring it to an elevated temperature of 800°–850° F., and hot rolling the ingot at substantially the aforesaid temperature in repeated passes to reduce its thickness to form a thin rigid neutron absorbing sheet material in which the particles of finely divided neutron absorbing material and metal powder are molecularly bonded together and to the inner surfaces of the thin metal outer plies produced from the top and bottom forming plates.

4,027,378

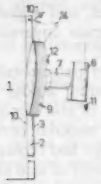
REMOVING DEPOSITED MATERIAL FROM THE EDGE PORTIONS OF A PLATE

Olov Carl Gustav Wennberg, 16, Champ du Vert Chasseur, B-1180 Brussels, Belgium, and Nils Harald Runfeldt, Lorensbergsgatan 11, S-654 68 Karlstad, Sweden

Division of Ser. No. 438,715, Feb. 1, 1974, abandoned. This application Nov. 10, 1975, Ser. No. 630,727
Claims priority, application Sweden, Feb. 8, 1973, 7301756
Int. Cl.² B23P *19/02*
U.S. Cl. 29—427 2 Claims

1. A method of removing deposited material in the form of a strip from an edge of a plate, comprising positioning against said edge of the plate the periphery of a roller that has corru-

gations along its periphery, the corrugations having sharp edges that extend all the way around the periphery of the roller, said edge of the plate being disposed at an acute angle to the axis of the roller at least at the point of contact of said roller with said edge, rotating the roller about its axis in a



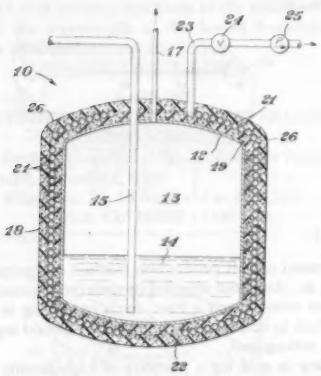
direction to remove material from the edge of the plate in a direction edgewise away from the plate, and moving the roller along the plate in a direction parallel to the edge of the plate while maintaining the periphery of the roller in contact with the edge of the plate.

4,027,379

METHOD OF INSULATING CRYOGENIC VESSELS

Chin Huan Cheng, and Burton D. Brubaker, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 370,242, June 15, 1973, abandoned. This application Dec. 23, 1974, Ser. No. 535,248
Int. Cl.² B21D *39/00*; B23P *19/04*
U.S. Cl. 29—455 R **6 Claims**



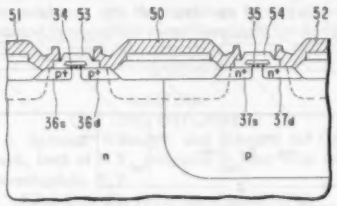
1. A method for the formation of a cryogenic vessel, the steps of the method comprising providing a vessel, applying thermal insulation thereto, the improvement which comprises incorporating tubing within at least a portion of the insulation, the tubing containing a gas at an absolute pressure not greater than about one millimeter of mercury absolute, the tubing containing the gas thereby providing improved thermal insulation of the vessel.

4,027,380

COMPLEMENTARY INSULATED GATE FIELD EFFECT TRANSISTOR STRUCTURE AND PROCESS FOR FABRICATING THE STRUCTURE

Bruce E. Deal, Palo Alto, and Daniel C. Hu, San Jose, both of Calif., assignors to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Division of Ser. No. 475,358, June 3, 1974, abandoned. This application Jan. 16, 1976, Ser. No. 649,957
Int. Cl.² B01J *17/00*
U.S. Cl. 29—571 **3 Claims**



1. A process for fabricating a complementary insulated gate field effect transistor structure wherein p-channel and n-channel devices are formed within the same semiconductor substrate, comprising:

a. applying a thermal oxidation masking material to a layer of n-type silicon including depositing a layer of silicon dioxide and depositing a layer of silicon nitride on said layer of silicon oxide;

b. defining said thermal oxidation material to establish protected active device regions and to open up isoplanar isolation regions;

c introducing a lightly doped n-type impurity in the substrate in isoplanar isolation regions;

d. heating said semiconductor substrate in the presence of an oxidizing agent to form isolation islands of silicon dioxide;

e. removing said thermal oxidation masking material;

f. predepositing n-type and p-type impurities in at least one active device region;

g. heating said substrate in an atmosphere containing less than 5 percent of an oxidizing agent to drive said n-type and p-type impurities into said substrate to form a composite conductivity well, the relative concentration of said n-type and p-type impurities producing a low net p-type concentration near the surface of said well and high net p-type concentration deep within said well;

h. thermally growing a thin layer of silicon dioxide in said active device regions;

i. depositing a conductive layer of polycrystalline silicon;

j. defining said layers of silicon dioxide and polycrystalline silicon to produce insulated gate electrodes for the p-channel and n-channel devices;

k. predepositing boron adjacent both sides of a defined gate electrode in an active device region formed in said layer of n-type silicon to form the source/drain regions of a p-channel field effect device;

l. predepositing phosphorus adjacent both sides of a defined gate electrode in an active device region formed in said composite well to produce the source/drain regions of an n-channel field effect device;

m. thermally driving in said impurities predeposited in said source/drain regions of said p-channel and n-channel devices;

n. forming a further layer of electrical insulation over said isolation islands; and

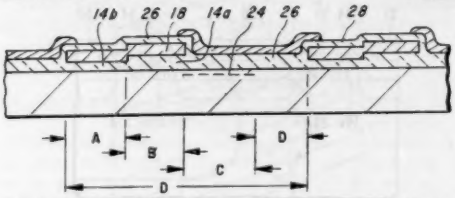
o. applying a conductive layer and defining said conductive layer to connect one of said source-drain regions of said p-channel field effect device and one of said source/drain regions of said n-channel field effect device and to effect external electrical coupling with the remaining source/-

drain regions of said n-channel and p-channel field effect devices.

4,027,381
SILICON GATE CCD STRUCTURE

Al F. Tasch, Jr., Richardson, and Robert C. Frye, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 598,316, July 23, 1975, abandoned. This application June 1, 1976, Ser. No. 691,656
Int. Cl.² B01J *17/00*
U.S. Cl. 29—578 **4 Claims**



1. In a method of fabricating a charge coupled device having adjacent overlapping phase electrodes separated from each other and from an underlying semiconductor substrate surface by a single insulator material, the steps of:

forming spaced polycrystalline semiconductor strips on a layer of insulating material overlying said surface of the semiconductor substrate such that first and second portions of each polycrystalline semiconductor material strip are respectively separated from the said surface by relatively thin and thick areas of said insulating material, and exposed regions of said semiconductor surface occupy spaces between said strips;

covering first portions of said exposed regions with masking material such that second portions of said exposed regions remain exposed, said second portions respectively defined by an edge of said masking material and an edge of a polycrystalline semiconductor strip;

implanting dopant ions into said remaining exposed regions to modify the surface potential at said semiconductor surface in said remaining exposed regions;

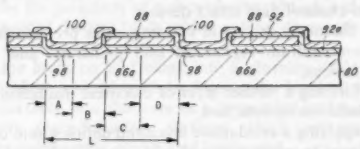
removing said masking material and forming a further layer of said insulating material over said exposed surface regions to the thickness of adjacent areas of insulating material beneath said polycrystalline semiconductor strips and to cover said polycrystalline semiconductor strips; and

forming conductive electrodes over said further insulating material between said polycrystalline strips, said conductive electrodes having marginal portions overlapping adjacent polycrystalline strips.

4,027,382
SILICON GATE CCD STRUCTURE

Al F. Tasch, Jr., Richardson, and Robert C. Frye, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 598,316, July 23, 1975, abandoned. This application June 1, 1976, Ser. No. 691,657
Int. Cl.² B01J *17/00*
U.S. Cl. 29—578 **5 Claims**



1. In a method of fabricating a charge coupled device structure having adjacent overlapping phase electrodes extending transversally over a channel formed in a semiconductor substrate, said phase electrodes separated from each other and from the underlying semiconductor substrate by a single insulator material, the steps of:

ion implanting spaced apart first surface potential modified regions in said semiconductor substrate and extending across said channel, said regions located beneath a surface of said substrate covered by a uniform thickness insulating material,

forming spaced apart polycrystalline semiconductor electrode strips extending across said channel and partly overlying portions of said doped regions,

removing insulating material between said polycrystalline semiconductor strips and replacing said removed insulating material by a layer of said same insulating material to said uniform thickness and to cover said polycrystalline semiconductor strips using a process causing significant diffusion of dopant impurities into said insulating material from semiconductor surface areas not overlaid by said polycrystalline semiconductor strips;

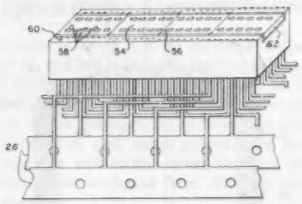
forming mask material over portions of said insulation material between said polycrystalline strips and ion implanting second modified surface potential regions in said semiconductor surface beneath areas of said insulating material between said polycrystalline semiconductor strips and respectively bounded by an edge of said mask material and an edge portion of a polycrystalline strip covered by insulating material beneath which there is no implanted first modified surface potential region, said first and second modified surface potential regions being formed by implanted dopant ions of the same conductivity type; and

forming conductive electrodes over said insulation material between said polycrystalline strips to overlap marginal portions of said polycrystalline strips.

4,027,383
INTEGRATED CIRCUIT PACKAGING

Terry O. Herndon, Carlisle, and Jack I. Raffel, Lexington, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 436,299, Jan. 24, 1974, abandoned. This application July 16, 1975, Ser. No. 596,472
Int. Cl.² B01J *17/00*
U.S. Cl. 29—577 **15 Claims**



1. Integrated circuit production method comprising,

forming an elongated channel or dielectric material having at least one leg and a base, each extending in the same direction to define an axis, the planes of said leg and base being orthogonal,

implanting in said leg a plurality of high density arrays of lead-in conductors extending orthogonally to said base through said leg and terminating with exposed ends in a plane parallel to the base, each array being axially displaced from each other to be non-overlapping and each array comprising a plurality of lead-in conductors,

each of said lead-in conductor arrays comprising a low density lead-out conductor array connected thereto, said lead-out arrays being axially displaced from each other to be partially overlapping,

adhering to said base an elongated semiconductor ribbon containing a plurality of circuit means each on a die and each containing multiple pads, the pads being in the same plane as said lead-in conductor ends,

each array of lead-in conductors being no longer than the length of each die along said axis, each die being laterally displaced and axially aligned with an array of lead-in conductors,

said dies being separated by laterally extending boundary lines,

forming electrical interconnections between an each array of lead-in conductor exposed ends and laterally displaced circuit pads of each of the axially aligned lead-in conductor arrays and circuit means, respectively,

and dividing the channel-ribbon assembly along said boundary lines to define discrete packages each containing a circuit means die with a circuit therein and an array of lead-out conductors therefor interconnected with the circuit by its connected array of lead-in conductors.

4,027,384
MICROWAVE ABSORBERS

Thomas M. Connolly, Canton, and Eino J. Luoma, Norwood, both of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

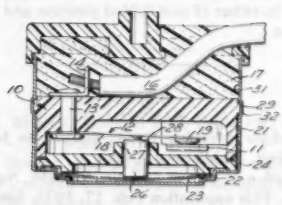
Division of Ser. No. 602,168, Aug. 5, 1975. This application Nov. 19, 1976, Ser. No. 743,430
Int. Cl.² H01S 4/00
U.S. Cl. 29—592 **4 Claims**

1. A process for fabricating a Jaumann microwave absorber of the type including a plurality of partially conductive lossy layers, separated by intermediate dielectric spacing layers all bonded together to form the absorber, which comprises, to form the lossy layers, applying to a base a film forming emulsion of pulverulent carbon, orienting and placing the pulverulent carbon on application to form a film having a homogeneity and isotropy such that average admittance values determined at a plurality of points in one degree of orientation do not differ from average values determined in another degree of orientation by more than ±0.02, bonding the lossy layer to an adjacent spacing layer having a dielectric constant of 1.03 and a loss tangent of 0.0001 by bonding means not disruptive to the pulverulent carbon conductance, orientation and film homogeneity, and maintaining a spacing layer thickness not greater than one-fourth of the wavelength at the highest frequency, such that the total thickness of the absorber is at least one-half of the wavelength at the lowest frequency of the range to be absorbed.

4,027,385
METHOD OF MANUFACTURING SEALED THERMOSTATS

Bernard S. Deubel, Mansfield, Ohio, assignor to Therm-O-Disc Incorporated, Mansfield, Ohio

Filed Jan. 26, 1976, Ser. No. 652,242
Int. Cl.² H01H 11/00
U.S. Cl. 29—622 **14 Claims**

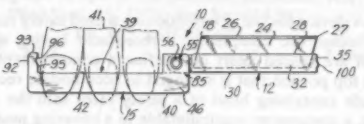


1. A method of manufacturing sealed thermal responsive devices in which said seal is maintained over a predetermined temperature range and the seal is established between a male member and a female member comprising sizing said members to provide a minimum interference fit, and assembling said male member within said female member to produce an interference fit seal, and interference during assembly being selected so that it is greater than the difference in coefficients of thermal expansion and contraction of said members times the difference in temperature between the temperature of assembly and the most adverse seal temperature within said predetermined temperature range times the linear dimension of said seal, said members also being selected so that the maximum elastic deformation within said predetermined temperature range is greater than said difference in coefficients in thermal expansion and contraction times the difference between the maximum and the minimum temperatures of said predetermined temperature range times said linear dimension.

4,027,386
CUTTING IMPLEMENT

Dominic J. Spinosa, Wantagh, and Edward R. Camillucci, Commack, both of N.Y., assignors to East/West Industries, Inc., Farmingdale, N.Y.

Filed Oct. 22, 1975, Ser. No. 624,718
Int. Cl.³ B26B 21/10, 5/00
U.S. Cl. 30—53 **24 Claims**



1. A cutting implement, comprising:

A. supporting means including an elongated body portion,

B. an elongated blade with a cutting edge extending along one edge thereof,

C. mounting means for maintaining said blade in fixed position relative to said supporting means with an exposed portion of said blade extending beyond said supporting means the complete length of said edge and extending in a plane substantially parallel to a surface of said supporting means, said mounting means including a pair of tongues extending transversely through said blade in said supporting means,

D. handle means including an elongated body portion,

E. chamber means extending longitudinally in said handle means and adapted to contain the exposed portion of said blade in the closed position of the implement,

F. securing means pivotally connecting said supporting means to said handle means at substantially one end thereof so as to provide relative angular displacement of said supporting means relative to said handle means from a closed position in which the front surfaces of said supporting means and said handle means extend in overlapping abutting relation to each other with the exposed portion of said blade extending within said handle means, to an open position wherein the complete length of said cutting edge is exposed for use thereof with said body portion extending in a plane below said cutting edge, said securing means including a fastener extending transversely through said supporting means and said handle means, and said fastener retains the overlapping surfaces of said supporting means and said handle means under compression,

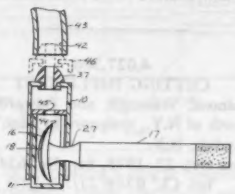
G. stopping means extending relative to said supporting means and said handle means for limiting the travel of the supporting means relative to the handle means from its closed to open position,

H. locking means associated with said handle means and said supporting means to retain the latter in a releasable fixed position in the closed position of the implement, and

I. gripping means on said handle means to permit a firm grip by the user, said gripping means including a recess having

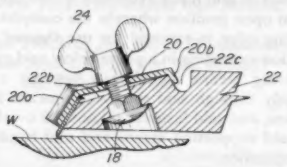
a front surface extending in a substantially horizontal plane relative to said cutting edge with spaced apart end walls to receive the fingers of the user therebetween, such that a firm grip of the cutting implement is obtainable during use thereof.

4,027,387
RAZOR BLADE CONDITIONING DEVICE
Harry Garfield Kellis, Rte. 5, Box 500, Ocala, Fla. 32670
Filed Oct. 16, 1975, Ser. No. 622,869
Int. Cl.² A45D *27/46*
U.S. Cl. 30—90 **1 Claim**



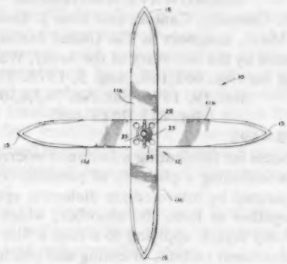
1. A device for use in conditioning a used safety razor blade for further use comprising a receptacle having side walls which are spaced apart and define a compartment with an open top portion that is arranged to accomodate reception of a blade containing head of a safety razor into the compartment, a component manipulatable to a covering position with respect to the open top portion of the receptacle and having a chamber for receiving a pressurized fluid, said component being arranged to telescopically fit onto said receptacle and having depending side walls that lap the side walls of the receptacle in said covering position, and means for coupling a household water faucet outlet to the chamber which is mounted on the component and arranged to define a fluid inlet to the chamber; said component having fluid distributor means which overlies the open top portion and separates the compartment and chamber in the covering position for the components, said distributor means having at least one passage for the discharge of fluid from the chamber into the compartment, and one of the side walls of said receptacle having an upwardly opening slot that is arranged to receive the neck of the safety razor when the head thereof is received in said compartment.

4,027,388
SCRAPER
Arthur T. Fletcher, Bristol, Conn., assignor to The Fletcher-Terry Company, Farmington, Conn.
Filed Oct. 14, 1975, Ser. No. 621,946
Int. Cl.² A47L *13/08*
U.S. Cl. 30—171 **1 Claim**



1. A scraper comprising a generally rectangular flat blade having at last two sharpened and rolled or burnished scraping edges defined along the opposed rectilinear longer sides, means for retaining said blade in an arcuate stressed configuration with one of said edges exposed and having an intermediate segment adapted to contact a flat surface to be scraped before the blades end portions, said blade retaining means including an elongated handle with a concave blade receiving receptacle at one end said receptacle having a relieved portion to accommodate the edge opposite said exposed edge, a clamping member of generally U-shaped configuration and defining a convex surface defined on the inner face of one leg of the U for engaging said blade, and an upper marginal portion defined by the web of the U, and the other leg of the U received in a locating groove defined in the handle, and a screw fastener extending through aligned openings in said clamping member and said handle to clamp said blade in said arcuate configuration, said blade being oriented at an obtuse angle with respect to the handle axis.

4,027,389
MULTIPLE BLADE FOLDABLE THROWING KNIFE
Maxwell G. Atchisson, 55 Old Yellow Springs Road, Apt. H, Fairborn, Ohio 45324
Filed May 24, 1976, Ser. No. 689,577
Int. Cl.² B26B *1/04;* **A63B** *65/00*
U.S. Cl. 30—303 **6 Claims**

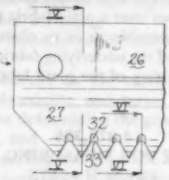


1. A multiple blade foldable throwing knife comprising:
a plurality of blades, each of said blades having a pointed distal end and a proximal end;
means interconnecting the proximal ends of each of said blades to selectably permit said blades to pivot about an axis; and
complementary engaging means at the proximal ends of each said blade, said engaging means being operative to retain said blades in either a folded position, wherein all said blades are stacked on each other, or in a throwing position, wherein said blades maintain a predetermined angular spacing in radial relation about said interconnecting means;
said engaging means comprising a plurality of projections extending outwardly from the proximal end of each blade on a first side thereof;
a plurality of recesses extending inwardly into each said proximal end on a second side thereof; and
said plural projections and plural recesses being of mutually complementary shape and location so that said projections removably enter into said recesses to retain said blades in either of said folded position and said throwing position.

4,027,390
SAW BLADE
Leo J. Kendzior, Meriden, Conn., assignor to Jarvis Products Corporation, Middletown, Conn.
Continuation-in-part of Ser. No. 520,056, Nov. 1, 1974, abandoned. This application Feb. 17, 1976, Ser. No. 658,282
Int. Cl.² B26B *9/02;* **B27B** *23/00*
U.S. Cl. 30—355 **3 Claims**

1. A straight saw blade adapted for reciprocation without tension in a carcass splitting saw, comprising a back portion having a back edge and an integral transversely tapering por-

tion integral with the back portion and having a cutting edge parallel to the back edge, the back portion having a substantially uniform thickness, the tapering portion having its greatest thickness at its line of junction with the back portion and being hollow ground with its least thickness along a line



slightly spaced from its cutting edge, saw teeth being formed in said cutting edge, each said tooth being adapted to remove a portion of the material being sawed, and the width of the back portion being no greater than about half of the distance from the back edge to the base of the teeth.

4,027,391

POSITIVE IDENTIFICATION METHOD AND STRUCTURE

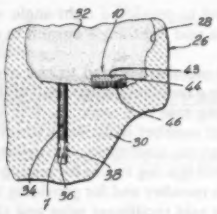
Philip Lawrence Samis, 35 Brynmor Avenue, Montreal West, Quebec, Canada

Filed Mar. 21, 1975, Ser. No. 560,616

Claims priority, application United Kingdom, Mar. 26, 1974, 13353/74

Int. Cl.² A61C *19/00*

U.S. Cl. 32—1 **27 Claims**



1. An identification means adapted for use in living bodies and more particularly to be embedded in a cavity in a highly mineralized portion of the body comprising a carrier made up of a substrate of relatively hard inert material having a high melting point at least as high as the highly mineralized portion of the body into which it is to be embedded; an etchable layer of an inert material on said substrate and including identifying intelligence etched thereon, said identification means including locating means.

4,027,392

ENDOSTEAL BIONIC TOOTH AND IMPLANTATION METHOD

Philip Nicholas Sawyer, and Boguslaw Stanczewski, both of Brooklyn, N.Y., assignors to Interface Biomedical Laboratories Corporation, Brooklyn, N.Y.

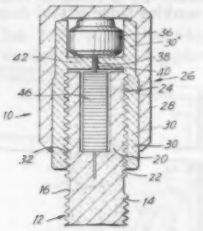
Filed May 10, 1976, Ser. No. 684,767

Int. Cl.² A61C *13/00*

U.S. Cl. 32—10 A **18 Claims**

1. An endosteal bionic tooth comprising:

an implant socket portion for implantation into bone, a crown portion attached to said lower socket portion and extending therefrom and means for supplying energy to



said implant socket portion for inducing the formation of callus and for preventing infection.

4,027,393

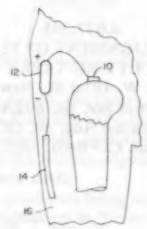
METHOD OF IN VIVO STERILIZATION OF SURGICAL IMPLANTABLES

Franklin H. Ellis, and Stephen W. Andrews, both of Rochester, N.Y., assignors to Sybron Corporation, Rochester, N.Y.

Filed Sept. 19, 1975, Ser. No. 614,911

Int. Cl.² A61C *13/00*

U.S. Cl. 32—10 A **2 Claims**



1. A method to sterilize exposed root canals of teeth during endodontic procedures, comprising of the steps of:

inserting a silver post into the root canal to the tip of said root canal; and

applying positive current to said post at a level of approximately one-half to two microamperes for a time sufficient to affect sterilization.

4,027,394

DRAPERY LENGTH MARKING DEVICE

Herbert Morantz, 1444 Wistar Drive, Wyncote, Pa. 19095, and Stanley Morantz, 425 Larkspur St., Philadelphia, Pa. 19116

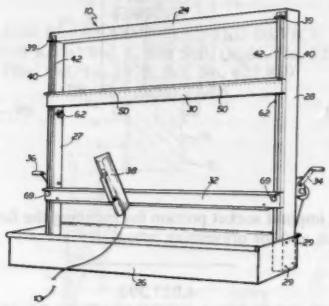
Filed Nov. 12, 1975, Ser. No. 631,019

Int. Cl.² B43L *13/00*

U.S. Cl. 33—18 R **10 Claims**

1. A drapery length marking device comprising a pair of uprights extending upwardly from a base, a ceiling bar and drapery length indicator adjustably secured to said uprights, means to move said drapery length indicator vertically with reference to said uprights, second means to move said ceiling bar vertically with reference to said uprights, with upward movement of said ceiling bar being limited by a stop adjacent the top of at least one of said uprights, said ceiling bar having a plurality of pin means to receive and hold a drapery, said drapery length indicator including a projecting outer marking ledge that is generally horizontally disposed, said drapery length indicator further possessing holding means adjustable at each end of said drapery length indicator adjacent said uprights, said holding means adjustably securing said drapery length indicator to said uprights to permit said drapery length

indicator to be held in a desired position for purposes of marking a lower edge of a drapery corresponding to an area to be covered by the completed drapery whereby said drapery passes about the marking ledge of said drapery length indicator and a marking device for marking a line on said drapery by abutment of the marking device on said drapery and said marking ledge as the marking device is moved across the drapery.



4,027,395

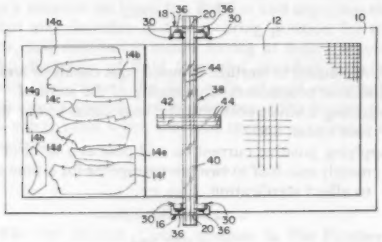
APPARATUS FOR ALIGNMENT OF PLAID FABRIC ON A CUTTING TABLE

Peter J. Vlahakis, 802 W. 181st St., New York, N.Y. 10033

Continuation-in-part of Ser. No. 602,459, Aug. 6, 1975, abandoned. This application Aug. 30, 1976, Ser. No. 718,542

Int. Cl.² B43L *5/02*

U.S. Cl. 33—80 **5 Claims**



1. Apparatus for the alignment of plaid fabric on a cutting table comprising in combination:

a pair of datum elements detachably fastenable to opposed sides of a cutting table, each of said datum elements having a transverse recess therein defined by parallel vertical faces thereof, and each of said datum elements having first and second upstanding guide members one on either side of said recess and respective slide clamp members carried slidably on said guide members, said slide clamp members being positionable vertically along said guide members and clampable at a desired elevation;

and a fabric alignment member including a first elongated element made of rigid transparent material and dimensioned to slide snugly within the opposed recesses of said pair of datum elements and a second elongated element made of rigid transparent material connected operably to said first elongated element and extending perpendicularly thereof, said first elongated element being provided with a plurality of guide lines extending lengthwise thereof and parallel with the longitudinal side edges thereof, and said second elongated element being provided with a plurality of guide lines extending lengthwise thereof and parallel with the side edges thereof;

whereby upon fastening of said pair of datum elements to the opposed sides of a cutting table and positioning said first elongated element of said fabric alignment member within the recesses of said datum elements and the fabric alignment member over a plaid fabric the said side clamp members are lowerable so as to clamp the fabric alignment member and the underlying fabric in place in proper alignment for cutting of the plaid fabric.

4,027,396

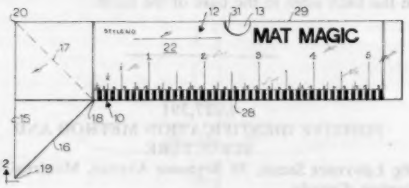
MARKING GAUGE FOR MEASURING AND MARKING FRENCH MATS

Donald Cameron Pierce, 59 Reposa Vista, Novato, Calif. 94947

Filed Apr. 1, 1976, Ser. No. 672,795

Int. Cl.² B43L *7/00*

U.S. Cl. 33—96 **7 Claims**



1. A marking gauge for measuring and marking desired distances on such things as French mats having a rectangular cutout area with right-angle corners, where it is desired to surround said cutout area with ruled lines and the like, comprising:

a sheet shaped to provide a right-angle vertex for engagement with a said right-angle corner, in order to align said gauge,

an elongated member secured to and overlying said sheet, having a long rectilinear edge passing through said vertex and bisecting said ring angle,

said elongated member including a lower portion overlying and secured to said sheet, an upper transparent face member, and spacing means for joining said lower portion to said face member and for providing therewith a pocket open along said rectilinear edge and closed at each end, one end being located precisely directly above said vertex, and

a marker scale in said pocket and having index markings along said rectilinear edge.

4,027,397

MOBILE TRACK SURVEYING APPARATUS

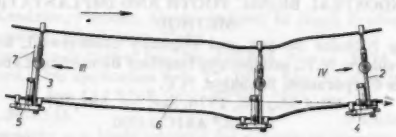
Josef Theurer, and Klaus Riessberger, both of Vienna, Austria, assignors to Franz Plasser Bahnbaumaschinen-Industrie-Gesellschaft m.b.H., Vienna, Austria

Filed Oct. 24, 1975, Ser. No. 625,486

Claims priority, application Austria, Dec. 9, 1974, 9831/74

Int. Cl.² E01B *35/08*

U.S. Cl. 33—287 **12 Claims**



1. A mobile track surveying apparatus comprising

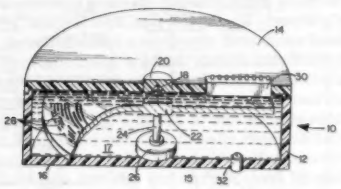
1. only two bogies, the bogies being spaced apart along the track elongation and mounted on rollers for mobility on the track, each bogie including a vertically adjustable carrier plate,
2. means for measuring the grade and means for measuring the lateral alignment of the track mounted on the carrier plates, the track grade measuring means and alignment measuring means including
   a. a theodolite mounted on the carrier plate of one of the bogies and
   b. a target mounted on the carrier plate of the other bogie, the theodolite and target defining an optical reference line determining the grade and the alignment of the track, and
3. means for measuring the gage and means for measuring the superelevation of the track mounted on the bogies.

4,027,398

SINGLE PIVOT REMOTE READING COMPASS

John T. Fowler, Winthrop, Mass., and Donald R. Furey, Metairie, La., assignors to The Laitram Corporation, Harahan, La.

Filed June 17, 1975, Ser. No. 587,720
Int. Cl.² G01C *17/26*
U.S. Cl. 33—363 K **11 Claims**



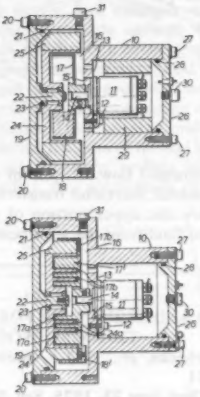
1. A remote reading magnetic compass comprising:
a housing filled with a damping liquid;
a rotatable compass disc assembly within said housing including:
a disc having coded representations of compass headings provided on a surface thereof and buoyant in said damping liquid;
a single pivot bearing coupling said disc to an upper portion of said housing and providing rotation of said disc about a normally vertical axis; and
magnet means disposed below said disc and spaced therefrom and affixed to said disc for rotation therewith;
said rotatable assembly being buoyant with respect to said damping liquid and supported by said single pivot bearing at a level in said dampling liquid below the normal level of buoyancy and having a center of gravity below the center of buoyancy to maintain said compass disc in intended horizontal dispostion;
said single pivot bearing being constructed to permit tilting of said housing with respect to a horizontal axis by a selected amount; and
means in said housing for photoelectrically sensing the coded representations on said compass disc to provide electrical output signals representative of compass heading.

4,027,399

POSITIONAL SENSING

Robert James Armstrong, and Boyd Stanley Cook, both of Bracknell, England, assignors to BP Trading Limited, London, England

Filed Jan. 7, 1976, Ser. No. 646,985
Claims priority, application United Kingdom, Jan. 27, 1975, 3494/75; Apr. 9, 1975, 14513/75
Int. Cl.² G01C *9/06*
U.S. Cl. 33—366 **17 Claims**



1. An angular positional sensor comprising:
a. a housing;
b. a rotary sensing device, the rotary sensing device having a freely rotatable shaft and being mounted in the housing, said sensing device being operative to produce a signal representative of the relative angular movement between the device and said shaft;
c. a pendulum, the pendulum being mounted on the shaft of the rotary sensing device in the housing and having low inertia;
d. a balanced member, the balanced member having high inertia relative to said pendulum inertia and being rotatably mounted within the housing adjacent the pendulum;
e. a liquid, the liquid being contained in at least the part of the housing containing the pendulum and the balanced member to provide a viscous coupling between the pendulum and the balanced member, the arrangement being such, that in use, angular movement of the housing about the longitudinal axis of the shaft causes movement of the rotary sensing device relative to the shaft which is retained stationary by the pendulum which in turn is damped by the balanced member, whereby a signal representative of such angular movement is produced by the rotary sensing device.

4,027,400

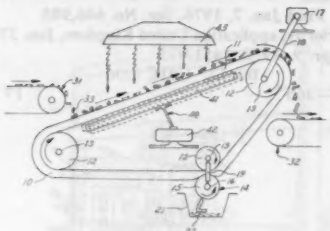
FLUID REMOVAL IN FOOD PROCESSING, METHOD AND APPARATUS

David R. Erickson, Downers Grove, Ill., assignor to Swift and Company Limited, Chicago, Ill.

Filed Jan. 6, 1975, Ser. No. 538,564
Int. Cl.² F26B *7/00*
U.S. Cl. 34—17 **12 Claims**

1. An improved method for removing fluid from commercially processed food items, comprising the steps of: maintaining a substantially continuous stream of absorbent material along an inclined run; supplying food items having a fluid residue at a location above the lower portion of said inclined run; passing said food items along said inclined run; mechanically vibrating said inclined run from below; radiantly heating said food items from above to promote flowability of said fluid

residue while simultaneously vibrationally tumbling said food items and contacting substantially the entire surface thereof with said stream of absorbent material; transmitting the fluid



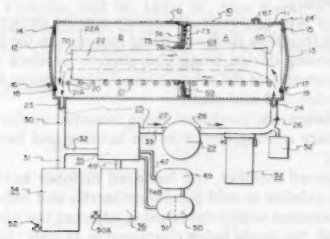
residue of increased flowability from said food items to the absorbent material; thereafter transferring said food items to a location below the upper portion of said inclined run; and removing said fluid from the absorbent material.

4,027,401

METHOD AND STRUCTURE FOR CURING AND/OR TREATING WOOD

John B. Fairbanks, Jr., 3927 S. 3030 East, Salt Lake City, Utah 84111

Filed June 23, 1975, Ser. No. 589,069
Int. Cl.² F26B *5/04*
U.S. Cl. 34—16.5 **20 Claims**



19. A process for during wood including the steps of: vacuum-pulling a fluid through a provided wood item in the direction of from a small pore cross-section to a large pore cross-section thereof; and collecting said fluid and any wood moistures carried thereby.

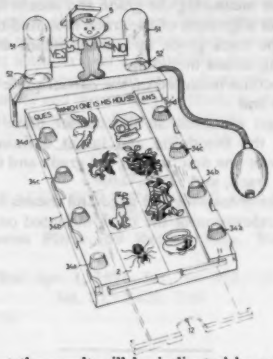
4,027,402

NOVEL EDUCATIONAL TOY

Hsing-ching Liu, and Lan-dih Liu, both of 3F, No. 213, Chung Ching North Rd., Sec. 4, Taipei, China /Taiwan

Filed Apr. 2, 1976, Ser. No. 673,085
Int. Cl.² G09B *3/02*
U.S. Cl. 35—9 R **8 Claims**

1. An educational toy comprising a case, a plurality of changeable question and answer combination cards having notches in various depths from both longitudinal sides thereof, a series of question setting means with respective releasable fixing means, a series of answer setting means with respective releasable fixing means, an indication mechanism to indicate either an affirmative or a negative answer is made, a pair of ropes extending along the longitudinal direction between a card and said question setting means as well as said answer setting means, respectively, and connecting to said indication mechanism, thereby the said ropes will be separately pressed by said question setting means and answer setting against both said notched sides of said card to determine the answer either affirmative or negative in accordance with corresponding depths of said notches pressed against from said both setting



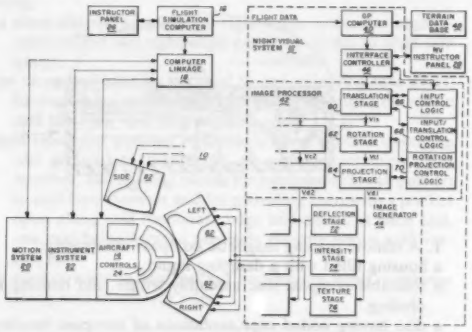
means, so that the result will be indicated by said indication mechanism.

4,027,403

REAL-TIME SIMULATION OF POINT SYSTEM HAVING MULTIDIRECTIONAL POINTS AS VIEWED BY A MOVING OBSERVER

David Raymond Marsh, Los Altos, and Raymond C. Osofsky, Santa Clara, both of Calif., assignors to The Singer Company, Binghamton, N.Y.

Filed Mar. 12, 1975, Ser. No. 557,714
Int. Cl.² G09B *9/08;* **B64G** *7/00;* **H04N** *7/18*
U.S. Cl. 35—10.2 **21 Claims**



1. A data processor responsive to observer position and orientation data and to object point data to simulate an image display of the visual relationship between an observer in a moving coordinate system and the object points in at least one object coordinate system;

at least one object data source for providing object point digital position data, and directional data for object points having characteristics which vary as a function of the direction in which the object is viewed;

computer means for receiving object point data and adapted to receive observer position and orientation data, responsive to the received data for providing a predetermined image digital data format having dedicated code bits for identifying classes of data;

a hard-wired image circuit which receives the image data format and is responsive to the code bits for processing the data, and responsive to the observer position data for translating the object point data into the observer coordinate system, and responsive to the orientation data for rotating the object point data to accommodate the ob-

server's axis of viewing, and which is adapted to forward the object point data to the image display device for providing a scene of the object point data in the observer perspective; and

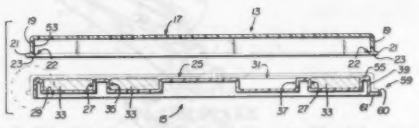
a hard-wired direction circuit which compares the observer position data with the object point data of each object point for determining the specific direction of the observer position relative to each object point, and which selects specific directional data for each object point based on the determined direction.

4,027,404

PAINT SET AND TEACHING AID

Robert D. Brant, Roseville, Mich., assignor to Palmer Paint Products, Inc., Troy, Mich.

Filed May 20, 1976, Ser. No. 688,196
Int. Cl.² G09B 11/10
U.S. Cl. 35—28.5 **7 Claims**



1. A color pigment paint teaching set comprising a base including a generally flat, circular central portion having a circular array of equi-angularly spaced, flat-bottomed recesses adapted to receive replaceable compressed pads containing pigments, said circular array of recesses normally receiving pads of progressively different colors in the color spectrum, said base being continuously bounded by an integral circumferential flange extending rearwardly from the plane of said central portion and having a plurality of substantially flat, individual tab members generally parallel to the plane of said central portion, integral with said flange and extending radially outward therefrom; and a resiliently firm cover having a transparent, circular central window portion rotatively overlaying said central portion so as to be parallel to but displaced forwardly thereof, said cover further having a rearwardly extending cylindrical flange adapted to be slideably received over said base flange and to be frictionally engaged thereby, said cylindrical flange including a relatively flat annular lip portion disposed adjacent the end thereof, said lip portion being substantially parallel to said window portion and being adapted to be slideably disposed against said tab members for rotation thereover, the cylindrical flange and annular lip portion of said cover cooperably engaging the rearwardly extending flange and tab members of said base such that said cover is normally retainably received over said base for rotation with respect thereto while simultaneously being frictionally retained thereover but such that said cover may be separated from said base and removed therefrom by the simultaneous application of manual force to said lip portion in a first direction generally toward said window portion and to at least one of said tab members in the opposite direction so as to overcome the frictional attachment and effect separation, said window portion of said cover including predetermined sets of distinctively and differently lined visible selector indicia viewable from above in juxtaposition relative to the differently colored pads for aiding in selecting, combining and balancing the colors of the spectrum.

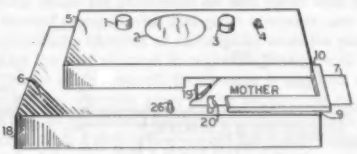
4,027,405

RECORD-REPRODUCE DEVICE FOR FLASH CARDS

Alden Schloss, P.O. Box 4862, North Hollywood, Calif. 91607

Filed Jan. 26, 1976, Ser. No. 652,091
Int. Cl.² G09B 5/04; G11B 21/02, 25/04
U.S. Cl. 35—35 C **7 Claims**

1. A recording-reproducing device for flash cards, utilizing a magnetic head, driven reciprocally on rods over magnetic tape, which is affixed to insertable-removable stationary cards, all of which are conventional and known, wherein the improvement comprises; a recording-reproducing device utilizing magnetic tape, affixed to insertable-removable means, which remain stationary during record and reproduce operation; the combination of a record-reproduce magnetic head, in bracket mounted slideably on parallel rods, said rods being also set parallel to, above and in alignment with the magnetic tape on insertable-removable means; guide, guide-stop and spring-holder, guide and allow entrance of insertable means to proper position in the device, and maintain such position; mechanical drive means to provide uniform head motion reciprocally on said rods, consists of a connecting rod, pinned at one end to the magnetic head bracket, said pin allowing rotational freedom of said connecting rod in a plane parallel to the plane of the magnetic tape; said connecting rod pinned at its other end in a socket affixed to a movable, endless belt, said other pin allowing rotational freedom of the rod in same plane as above mentioned; said movable, endless belt girds two pulleys, one an idler pulley, free rotationally on its axis; the



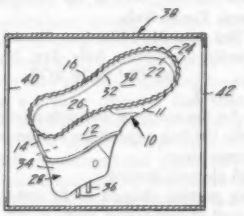
other wheel pulley is attached axially coincident to a wheel, edged with relatively frictonal material, said wheel being free to rotate on its axis; a spring-mounted motor, bearing its shaft with sufficient normal force against the wheel edge, said motor shaft being essentially parallel to the axis of the wheel, imparts rotational motion to said wheel; switch means with attached actuating arm, in position to come in contact with the socket on belt, said switch means thus acting to control the motor; a momentary switch electrically in parallel with above switch means, which when manually depressed, starts said motor, a third switch with actuating arm attached, positioned to come in contact with connecting rod on its return run, serves to disconnect said head from circuit; a resilient undersupport, mounted in position to correspond to magnetic tape on inserted, insertable-removable means, said insertable-removable means flexibly holding the magnetic tape; means to provide proper longitudinal tension to magnetic tape and said rods positioned at such height above magnetic tape, as to have magnetic head depress magnetic tape into resilient undersupport, as it passes over the magnetic tape.

4,027,406

METHOD OF LASTING SHOE UPPERS TO A LAST AND LASTED SHOE UPPERS AND ARTICLES OF FOOTWEAR PRODUCED THEREBY

Michael Salvatore, 68 Birch Lane, Greenwich, Conn. 06830

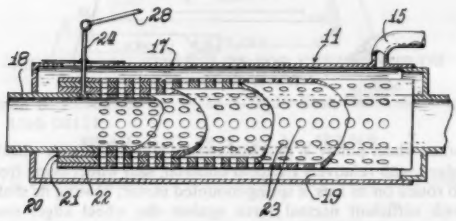
Filed May 13, 1976, Ser. No. 686,126
Int. Cl.² A43D 21/00; A43B 00/00
U.S. Cl. 36—83 **35 Claims**



1. A method of lasting a shoe upper having a lasting margin, to a last, which comprises:

attaching a lasting piece made of shrinkable polymeric material to the shoe upper lasting margin,
shrinking the polymeric material, and
utilizing the shrinkage of the polymeric material to last the shoe upper to the last.

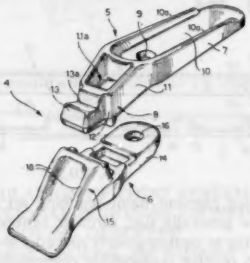
4,027,407
JET FLOW ALTERNATOR
Sandor G. Kiss, 236 E. Sunset Ave., Lombard, Ill. 60148
Filed Nov. 24, 1975, Ser. No. 634,550
Int. Cl.² E02F *3/92*; **F04F** *5/00*, *5/42*; **B63H** *11/00*
U.S. Cl. 37—61 **8 Claims**



1. A jet flow alternator for directing the flow of a fluid substance in a select direction comprising, in combination, an outer cylindrical shell, a pipe of lesser diameter than said shell extending axially through said shell and through which a substance flows, means at the ends of said shell closing the space between the shell and pipe to provide a cylindrical chamber between them, a plurality of superposed tubes mounted around said pipe, said tubes being shiftable with respect to each other and said pipe, a plurality of circumferentially and axially spaced apertures in said tubes and pipe, said apertures being aligned normally to provide fluid passageways, means to deliver pressurized fluid of greater pressure than in said pipe into said chamber for passage through said passageways into the interior of the pipe, and means to shift the tubes relative to the pipe and to each other to offset the apertures in the tubes with respect to the apertures in the pipe to direct the pressurized fluid entering the pipe through said passageways towards a selected end of the alternator.

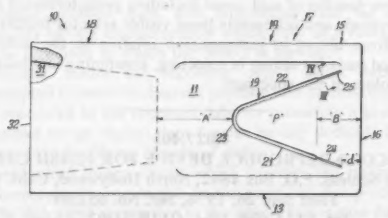
4,027,408
DIGGER TEETH WITH INTERLOCKING TOOTH ELEMENTS
Ferdinando Ramella, Via La Salle 72; Pier Vincenzo Ramella, and Arnaldo Ramella, both of Via Generale Perotti 102, all of Grugliasco, Turin, Italy
Filed Jan. 21, 1976, Ser. No. 651,319
Claims priority, application Italy, Jan. 28, 1975, 67195/75
Int. Cl.² E02F *9/28*
U.S. Cl. 37—141 T **3 Claims**

1. A tooth for the scoop of an earth-moving machine, to be assembled onto the free edge of the bottom wall of said scoop, said tooth comprising:
a first tooth element having,
an elongate portion shaped to fit onto one face of said bottom wall of said scoop, and
a shaped projecting portion which extends forwardly of said free edge of said bottom wall of said scoop when said first tooth element is fitted thereto,
a second tooth element having,
an elongate portion shaped to fit onto the other face of said bottom wall of said scoop directly opposite said elongate portion of said first tooth element, and
an enlarged wedge-shaped projecting portion, said wedge-shaped projecting portion extending forwardly from the free edge of said bottom wall when said second tooth element is mounted thereon, said wedge-shaped projecting portion of said second tooth element having a rear surface and two inclined surfaces which diverge rearwardly to said rear surface,
means defining an aperture in said rear surface, said aperture communicating with an interior cavity within said wedge-shaped projecting portion,
one of said two inclined surfaces of said wedge-shaped projecting portion being generally continuous with that



surface of said elongate portion of said second element which is remote from said bottom wall of the scoop upon assembly of the tooth thereto,
the edge of said aperture in said rear surface of said wedge-shaped projecting portion remote from said elongate portion of said second element being undercut to form a lip under which engages the end of said shaped projecting portion of said first tooth element, and
means defining a transverse groove in said end of said shaped projecting portion of said first tooth element, said transverse groove receiving said lip upon assembly of said two tooth elements whereby said first and second tooth elements are interengaged and locked together to resist relative separating movement in a direction transverse the length of said elongate portions of said first and second tooth elements.

4,027,409
GROUND ENGAGING ELEMENT HAVING A CONTROLLED CUTTING EDGE
Visvaldis A. Stepe, Willow Springs, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed July 2, 1976, Ser. No. 702,170
Int. Cl.² E02F *9/28*
U.S. Cl. 37—142 R **11 Claims**



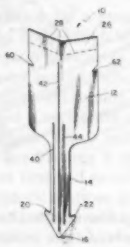
1. A ground engaging element having first and second opposed surfaces, first and second edges, a forward end portion, a middle portion and a rearward end portion, said first and

second surfaces converging from the rearward toward the forward portion to form a relatively sharp forward edge for penetrating the earth, said middle portion having at least one slot extending through the element from the first to the second surfaces and extending along the middle portion, said slot being of general "U" configuration having leg portions of the slot spaced from the first and second edge portions and extending outwardly from a curvilinear middle portion of the slot, said curvilinear portion being positioned a preselected distance from the rearward end portion and said leg portions terminating a preselected distance from the forward edge for controlled breakaway of a central portion of the element in response to forces subjected on the element after the forward end portion has been worn away a preselected amount.

4,027,410
PLANT STAKE

Philip T. Wheeler, Dewitt, Mich., assignor to The John Henry Company, Lansing, Mich.

Filed Mar. 18, 1976, Ser. No. 668,212
Int. Cl.² G09F *3/18*
U.S. Cl. 40—10 C 5 Claims



1. An identifying stake for insertion into a soil mixture and which is formable from a thin, flexible material yet sufficiently rigid to permit insertion and also capable of reisiting removal from the soil, said stake comprising:

a generally planar body member;

a planar shaft-like member having a width substantially greater than its thickness, integral with said body member and extending outwardly therefrom, said body member having a rectangular shape and a transverse dimension substantially greater than the transverse dimension of said shaft-like member;

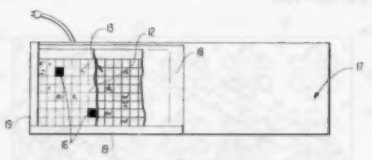
a generally triangular-shaped, planar head portion integral with said shaft-like member and extending outwardly therefrom opposite said body member, the base of said head portion being dimensioned greater than the transverse dimension of said shaft-like member to thereby define a barb, said head portion, said body member and said shaft-like member being generally curved in cross-section to thereby increase the rigidity of said stake; and

a plurality of indentations extending longitudinally of said head portion, said shaft-like member and said body member for at least a portion thereof, said generally planar body member further defining a pair of opposed inwardly directed notches in the lateral edges thereof spaced from the end of said planar member opposite said head portion, said notches providing convenient points for the securement of string and the like.

4,027,411
MICROFICHE MARKING SYSTEM

Joseph Foldessy, Jr., 18430 NW. 38 Court, Opa Locka, Fla. 33055

Filed Feb. 19, 1976, Ser. No. 659,444
Int. Cl.² G09F *13/10*
U.S. Cl. 40—106.1 4 Claims

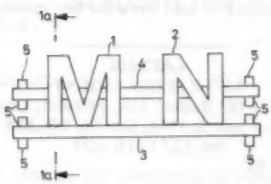


1. A microfiche marking system comprising in combination an illuminated viewer having a translucent viewing panel and a pair of right angular guide elements defining one corner of said panel, an encoded transparent coordinate grid element of rectangular shape for placement on said panel with a square corner thereof engaged with said guide elements, and a translucent microfiche element of rectangular form for placement directly on the grid element in registration therewith while a square corner of the microfiche element is engaged with the guide elements, whereby areas of the illuminated microfiche element may be accurately marked with translucent or opaque ink to indicate to a subsequent reader that certain stored data is updated, changed or deleted, the encoded indicia of the grid element being viewable through the translucent microfiche element while both elements are positioned in registration on said illuminated panel.

4,027,412
ADVERTISING LETTERING AND SUPPORT THEREFOR

Eugen Hoerner, Neuer Weg 2, D-7101 Eberstadt, Germany

Filed Aug. 11, 1975, Ser. No. 603,258
Claims priority, application Germany, Aug. 12, 1974, 2438609
Int. Cl.² G09F *7/00*
U.S. Cl. 40—125 R 5 Claims



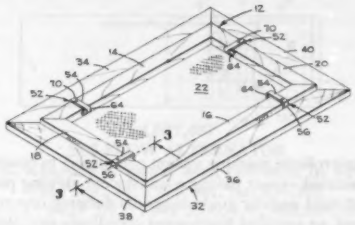
1. An advertising sign assembly comprising a horizontally extending U-shaped channel having a vertical back portion, an upper limb portion extending horizontally forwardly from said back portion and having at its forward edge a vertical marginal portion and a lower limb portion extending horizontally from said back portion a greater distance than said upper limb portion to provide a marginal portion projecting beyond said marginal portion of said upper limb portion of the channel, and a plurality of three dimentional characters mounted on and supported by said channel, said characters resting on and being secured to said projecting marginal portion of said lower limb portion of said channel and resting against and being secured to said vertical marginal portion of said upper limb portion of said channel.

4,027,413

CLIP FOR RETAINING A CANVAS STRETCHER FRAME IN A DECORATIVE PICTURE FRAME

Earl J. Moede, San Jose, Calif., assignor to McNeill Favia Co., Mountain View, Calif.

Filed June 18, 1976, Ser. No. 697,313
Int. Cl.[2] G09F 1/12
U.S. Cl. 40—156 9 Claims



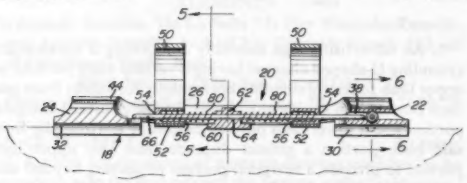
1. An article of manufacture comprising a strip of resilient material having an elongate main body, a first leg extending from one end of the body and a second leg extending from the opposite end of the body, said first leg being generally normal to said main body and having at the distal end thereof at least one point extending outward therefrom in general parallelism with said main body, the material having sufficient strength that the point is substantially immovable relative to said first leg, said second leg having a resiliently deformable portion for effecting frictional engagement with a surface of a rigid bar disposed intermediate said first and second legs, said article of manufacture affording installation of a first polygonal canvas stretcher frame into a second decorative frame which has a rabbet groove for receiving said first frame thereinto, said second frame being proportioned so that a clearance space is defined between the outer edge of said first frame and a surface of said rabbet groove which clearance space is less than the extent of said point, said first frame being formed of stretcher bars having a width greater than the distance between said first leg and said resiliently deformable portion and a thickness greater than the length of said first and second legs so that said point can be introduced into said clearance space and the article can be rotated to cause said point to be pierced into a portion of said second frame defining said rabbet groove and to bring said main body against the rear surface of said stretcher bar there to be retained by frictional engagement between said resiliently deformable portion on said second leg and an edge surface of said stretcher bar remote from said rabbet groove.

4,027,414

RIFLE SCOPE MOUNT

Thomas R. Felix, 163 Bunker Ave., Meriden, Conn. 06450

Filed Jan. 5, 1976, Ser. No. 646,588
Int. Cl.[2] F41G 1/38
U.S. Cl. 42—1 ST 12 Claims



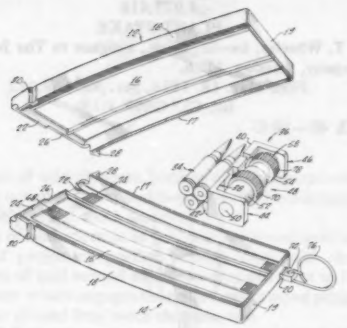
1. In combination, a scope mount including an elongated base for mounting on a gun barrel with the base extending longitudinally of said barrel, said base including opposite end portions and a longitudinally slotted mid-portion extending therebetween, a pair of scope mounting rings seatable against said base on one side thereof through which said slot opens and including outstanding mounting lug portions projecting into and slidable along said slot, said mounting lug portions including aligned bores extending therethrough longitudinally of said slot, an elongated shaft disposed in said slot, extending therealong and received through said bores, an abutment member opposing the opposite side of said base through which said slot also opens, said abutment member including an anchor lug projecting into said slot between said lug portions and having a bore formed therethrough through which said shaft is received, and resilient means connected between said abutment member and said base yieldingly biasing said abutment member in a direction extending outwardly of said opposite side of said base.

4,027,415

AMMUNITION MAGAZINE

Eugene M. Stoner, Stuart, Fla., assignor to Ares, Inc., Port Clinton, Ohio

Filed Sept. 2, 1975, Ser. No. 609,356
Int. Cl.[2] F41C 25/04
U.S. Cl. 42—50 6 Claims



1. An ammunition magazine adapted to be pre-loaded and stored for extended periods of time comprising, in combination:

an elongated sector-shaped hollow housing having top and bottom ends and having an ammunition feed opening at the top end;

the housing having opposite side walls, and front and rear edge walls joining said side walls;

a plurality of stacked ammunition rounds substantially filling said housing, the rounds of ammunition in the stack being disposed approximately parallel to said side walls;

a gear rack extending longitudinally of the housing along the interior of one of said side walls;

an ammunition follower moveable along the interior of said housing and disposed adjacent the bottom end thereof in engagement with the stack of ammunition rounds;

a spring motor mounted on said ammunition follower for movement therewith along the interior of the housing;

said spring motor including a rotary drive gear engaged with said gear rack for urging the ammunition follower along with the ammunition toward said ammunition feed opening;

said spring motor being disposed in an operationally unstressed condition;

said spring motor including a separate rotary energizing member, and means limiting rotation of the energizing member to the direction which places the spring motor in an operationally stressed condition; and,

means manually engageable from the exterior of the housing for rotating said energizing member to energize said spring motor to an operationally stressed condition.

4,027,416
ARTICULATION DEVICE FOR GUNSTOCKS OF LONG FIREARMS

Jose Luis Alfonso Berbegal, 5-7 Oviedo St., Zaragoza, Spain

Filed Nov. 11, 1975, Ser. No. 631,179
Claims priority, application Spain, Nov. 19, 1974, 207609[U]
Int. Cl.² F41C *23/00*
U.S. Cl. 42—73 9 Claims

1. Articulation device for a gunstock: said gunstock comprising an elongated body which is divided into two sections, including a first section attachable to the firearms supported by said gunstock and a second section emplaceable against the body of the user; each said section of said gunstock having a surface facing toward a cooperating surface on the other said section of said gunstock, which said cooperating surfaces are securable together for forming a unitary gunstock; said gunstock having at least first and second opposite sides;

between said gunstock sections and in engagement with the cooperating surfaces thereof is positioned a plurality of insert pieces placed one next to the other in a line, which together are of a thickness sufficient to change the length of said gunstock when said sections of said gunstock are fastened together with said insert pieces therebetween;

a first said insert piece having respective third and fourth opposite, outwardly facing sides with said third side facing toward said gunstock first section and said fourth side facing toward said gunstock second section; one of said third and fourth sides having a first peripheral rim extending thereabout and projecting therefrom and the other of said third and fourth sides having a first peripheral recess defined therein;

a second said insert piece positioned between said first insert piece and said gunstock first section; said second insert piece having a fifth side facing toward said first insert piece;

a third insert piece positioned between said first insert piece and said gunstock second section; said third insert piece having a sixth side facing toward said first insert piece;

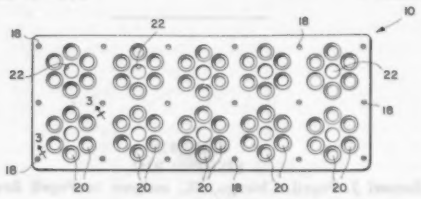
the one of said fifth and said sixth sides facing toward said first peripheral rim having a second peripheral recess shaped and positioned to receive said first peripheral rim in tongue in groove fashion; the other of said fifth and said sixth sides facing toward said first peripheral recess having a second peripheral rim shaped and positioned to project into and be received in said first peripheral recess in tongue-in-groove fashion, thereby aligning all said insert pieces;

fastening means extending between said gunstock sections for holding same securely together.

4,027,417
CARTRIDGE LOADING TRAY

Rudolf W. Swatek, 32 Channing Drive, Ringwood, N.J. 07456

Filed Aug. 24, 1976, Ser. No. 716,991
Int. Cl.² F42B *39/06*
U.S. Cl. 42—87 6 Claims



1. A cartridge loading tray for use with speed loaders comprising in combination:

an assembly including upper and lower superposed rigid boards and a layer of resilient material therebetween;

a plurality of groups of apertures formed in said upper board extending therethrough, each of said groups being arrange in a circular pattern;

a plurality of groups of apertures formed in said layer of resilient material equal in number to and in alignment with the apertures of the groups in said upper board, and the diameter of the apertures in said resilient layer being less than that of the apertures in said upper board; and

a plurality of groups of apertures formed in said lower board equal in number to and in alignment with the apertures of the groups in said upper board and intermediate resilient layer, the diameter of the apertures in said lower board being equal to those of said upper board, and the apertures in said lower board extending from the interface between same and said resilient layer and terminating therewithin.

4,027,418
RESILIENT TUBING-POWERED GIG FOR SPEARING FISH

Daniel Gerard Baldi, 36 Crestfield Drive, Brockton, Mass. 02402, and James Allen Baldi, 120 Sumner St., Newton Centre, Mass. 02159

Filed Mar. 4, 1976, Ser. No. 663,977
Int. Cl.² A01K *81/04*
U.S. Cl. 43—6 1 Claim

1. A fish spearing gig comprising, in combination, (1) a handgrip; (2) a spear shaft with a kerf around it, slidably mounted in a bore, longer in its vertical axis than in its horizontal axis, running longitudinally through the handgrip; (3) a pin transversing the bore near the roof of said bore in the handgrip to engage the kerf in the slidably mounted spear shaft; (4) a loop formed of resilient tubing to power the spear shaft, attached to the rearward end of the spear shaft and to the handgrip in a hole that has a slot in its wall and that transverses the handgrip under the bore; (5) an end cap with a hole transversing it so that the cut ends of the resilient tubing pass through it in opposite directions to complete the loop, said resilient tubing being stretched tight as the spear shaft is moved backward through the bore in the handgrip, causing the spear to incline upward to allow the engagement of the pin by the kerf in the spear shaft so that the spear is ready to be fired by pushing the front of the spear shaft downward, thus

disengaging the kerf from the pin and allowing the spear to move forward as the resilient tubing contracts.

4,027,419

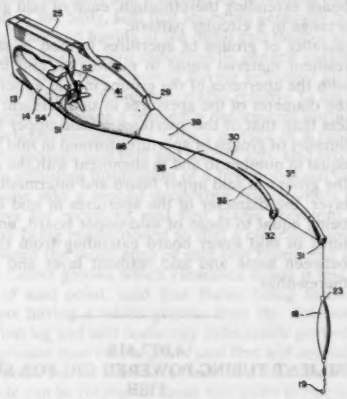
FISHING RIG

Samuel J. Popeil, Chicago, Ill., assignor to Popeil Brothers, Inc., Chicago, Ill.

Continuation of Ser. No. 474,661, May 30, 1974, abandoned, which is a continuation of Ser. No. 269,815, July 7, 1972, abandoned. This application Oct. 20, 1975, Ser. No. 623,604

Int. Cl.² A01K *87/00*

U.S. Cl. 43—18 R 33 Claims



1. A fishing rig comprising, in combination,
a reel housing portion,
a fishing reel and line encased in said housing portion,
guide means for said line in the housing portion,
a handle portion at one end of said reel housing portion positioned to one side of a horizontal plane passing through said line guide means,
a rod pivotally secured by pivotal support means to one end of said reel housing portion opposite said handle portion,
engaging means spaced from said pivotal support means on said end opposite the handle portion for releasably and lockably securing said rod to said reel housing portion in an operative position,
an elongate upwardly opening tackle box within one portion of the handle which receives the fishing lure, hook, and related fish catching elements secured to the remote portion of the line,
pivotal rearwardly opening cover means for said tackle box,
fishing line guide means provided in the handle between the retracted position of the remote end of the rod and the tackle box for storing the fishing apparatus,
said rod and said housing having a substantially complementary silhouette,
whereby the rod, upon release of the engaging means, is foldable against the reel housing portion in a retracted position between its opposed ends with the rod being in close proximity to that portion of the housing and handle on the opposite side of said horizontal plane from the handle and along substantially the length of the rod.

4,027,420

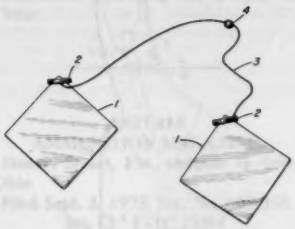
AIR DROPPED BAIT DISPENSERS FOR ATTRACTING AND KILLING THE COTTON BOLL WEEVIL

Gerald H. McKibben, and Theodore B. Davich, both of Starkville, Miss., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Sept. 19, 1975, Ser. No. 615,035

Int. Cl.² A01M *1/20*

U.S. Cl. 43—124 7 Claims



1. An apparatus capable of being dropped from an airplane used to attract and kill boll weevils comprising in combination
a. two base members;
b. means for connecting together said base members such that the maximum distance between said base members is sufficient to give the apparatus aerodynamic balance when said apparatus is dropped from an airplane;
c. a grandlure mixture serving as an attractant affixed to said means;
d. a bait means affixed to each base member, said bait means impregnated with a toxic material.

4,027,421

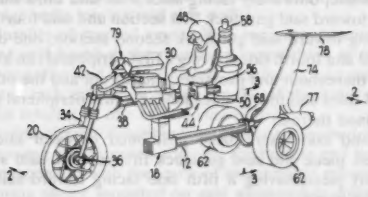
WHEELED VEHICLE CONSTRUCTION KIT

Robert K. Allen, Hinsdale, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

Filed Jan. 28, 1976, Ser. No. 653,262

Int. Cl.² A63H *17/00*

U.S. Cl. 46—17 15 Claims



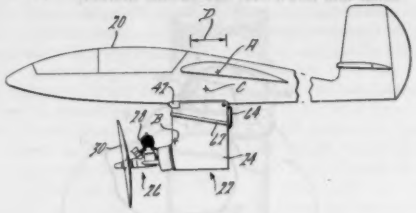
1. A construction kit in the form of a wheeled toy vehicle, comprising:
a front-to-rear elongated frame;
front wheel means removably mountable generally at the front of said frame;
rear wheel means removably mountable generally at the rear of said frame; and
a plurality of different vehicle components removably mountable at various selected positions along the frame in front of said front wheel means, between the front and rear wheel means, and behind said rear wheel means so as to permit changing the characteristic appearance of the vehicle by choice selection of the particular positions of the vehicle components.

4,027,422

MODEL AIRCRAFT PROPULSION

Lloyd A. Schroeder, 5391 Robinwood Drive, North Street, Mich. 48049

Continuation-in-part of Ser. No. 617,790, Sept. 29, 1975, Pat. No. 3,999,328, which is a continuation-in-part of Ser. No. 422,688, Dec. 7, 1973, Pat. No. 3,908,305. This application Mar. 22, 1976, Ser. No. 668,828
Int. Cl.² A63H *27/00, 33/20*
U.S. Cl. 46—78 10 Claims



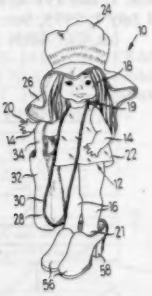
1. A power pod for an aircraft having a fuselage, propulsion means on said pod to provide forward thrust to said glider plane, coupling means for releasably securing said pod to said fuselage, means causing the release and separation of said pod from said coupling means, a parachute within the pod, a supporting cord connected to the coupling means and fuselage, and a friction member on the supporting cord defining a portion which has friction engagement with the parachute sufficient to withdraw the parachute from the pod and permit the pod and propulsion means to pull the parachute from the friction member and separate it from the glider plane.

4,027,423

DOLL WITH OVERSIZE SHOES AND SECURING MEANS THEREFOR

Gordon A. Barlow, Skokie, and Allison W. Katzman, Chicago, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed June 2, 1975, Ser. No. 583,120
Int. Cl.² A63H *3/36*
U.S. Cl. 46—116 4 Claims



1. A user participation toy, comprising:

a figure toy in the form of a doll having a torso portion and appendages including a pair of arms, a pair of legs, a head portion mounted to the torso portion, and a pair of feet mounted at the base of said legs; and

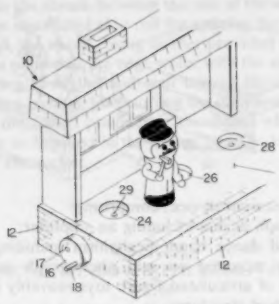
a pair of shoes for use with and positionable on said doll, said shoes being of oversized proportions relative to the feet at the ends of said doll legs, each of said shoes including a sole, a back portion with an inwardly facing surface and means for securing said feet to the relatively larger shoes in a position spaced forwardly from said back portion and in an elevated position relative to the sole of the shoes.

4,027,424

MULTI-STRUCTURE ANIMATED AMUSEMENT DEVICE

Eugene Joseph Kilroy, Jr., Inglewood; Philip Warren Crain, Redondo Beach, and James Frank Woods, Yettem, all of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Jan. 26, 1976, Ser. No. 652,003
Int. Cl.² A63H *13/04*
U.S. Cl. 46—116 4 Claims



1. An animated amusement device comprising in combination:

at least a first and second simulted building structure, each of said simulated building structures having a floor;

a foundation for supporting said floor, and at least one cavity recessed in said floor adapted to receive the base of an animated figurine for seating an animated figurine, said cavity including a bottom surface and a small plunger-receiving opening in said bottom surface forming a passage to the space underlying said floor adapted to receive a plunger depending from the base of such animated figurine, each said structure further including a crankshaft located under said floor, said crankshaft containing a cam means located underlying said small passage in said cavity for engaging any plunger inserted through said passage;

a first and a second crank means of substantially identical structure, each of said crank means including a crank wheel having an axis of rotation, a crank handle of small cylindrical geometry coupled to and orthogonally projecting from said wheel at a predetermined radial distance from said wheel axis, and a crank handle-receiving opening located in said wheel diametrically opposite said crank handle and at the same radial distance from said wheel axis;

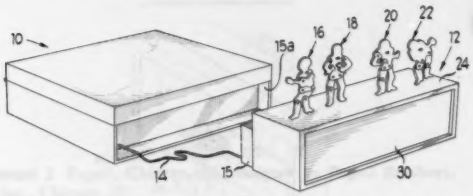
said first crank wheel located on one side of said simulated structure and operatively coupled to said crankshaft for joint rotational movement therewith and said second crankwheel located on the opposite side of said simulated structure and operatively coupled to said crankshaft for joint rotational movement therewith, said wheels being mounted for rotation about the wheel axis and with the wheel axis of each being located on a common axis located a predetermined distance above the bottom of said building foundation;

whereby each one of said crank means drives said cam means to reciprocate any plunger of a figurine protruding through said cavity opening and drives the other one of said crankwheels, and whereby, when said crank wheel of said one of said structures is coupled to the crank wheel of the other of said structures by engagement of the crank handles of one crank wheel into the crank handle-receiving means in the crank wheel of the adjoining simulted structure the cam means of said second simulated structure is simultaneously driven.

4,027,425
SOUND ACTUATED FIGURE TOYS

Howard J. Morrison, 1250 Deer Park Lane, Deerfield, Ill. 60015, and Albert G. Keller, 3820 W. 59th St., Chicago, Ill. 60629

Filed Aug. 13, 1975, Ser. No. 604,425
Int. Cl.² A63H *13/00*
U.S. Cl. 46—264 **1 Claim**



1. An amusement device, comprising:
a phonograph device including an amplifier;
a simulated dance band mechanism including a support structure mounted on said phonograph device and a plurality of articulated figure toys movably mounted on said support structure;
rotary drive means mounted in said support structure including cam means for moving said figure toys in a cyclic, generally vertical reciprocating manner relative to said support structure; and
signal responsive control means connecting said drive means and said amplifier for energizing the drive means by a signal provided from the output of said amplifier and thereby moving said figure toys in response to a predetermined amplitude signal from said amplifier, said control means including a gated controlled rectifier in series with said drive means and a low pass filter connected between the amplifier and the gate of said controlled rectifier so that the drive means is energized by only low frequency signals at said predetermined amplitude.

4,027,426
PRE-LABELLED COATED CONTAINER

Wayne A. Wallding, Horseheads, and Roy S. Arrandale, Elmira, both of N.Y., assignors to Dart Industries Inc., Los Angeles, Calif.

Division of Ser. No. 466,333, May 2, 1974, abandoned. This application Jan. 15, 1975, Ser. No. 541,903
Int. Cl.² G09F *3/10*
U.S. Cl. 40—310 **5 Claims**

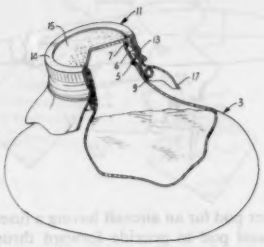
1. A pre-labelled container having glass sidewalls substantially covered with an undercoating of a polymer of ethylenically unsaturated carboxylic acid;
a label of heat insulative material having a lesser areal extent than said undercoating, said label being bonded to said undercoating with an adhesive consisting of a polymer of ethylenically unsaturated carboxylic acid; and,
a continuous plastic outercoating over said label and said polymer film, said outercoating being permanently bonded to said undercoating.

4,027,427
METHOD AND APPARATUS FOR THE PRODUCTION OF SPAWN

Benjamin B. Stoller, 1211 Fair Ave., Santa Cruz, Calif. 95061, and John C. Azzolini, Jr., 411 Chatham St., Avondale, Pa. 19311

Filed July 16, 1976, Ser. No. 706,063
Int. Cl.² A01G *1/04*
U.S. Cl. 47—1.1 **4 Claims**

2. The method of growing micro-organisms, tissues and mycelium comprising the following steps:
a. providing a threaded collar having an open top and bottom and with an inturned top rim;
b. providing a cap for said collar, said cap having a largely open top portion with an inturned lip mating with said rim;
c. providing a filter porous to air but not porous to microbes, said filter fitting between said rim and said lip;
d. providing a plastic bag, said bag being made of a transparent, heat-sterilizable moisture impervious material;
e. passing the open mouth of said bag upwardly through said collar and down over the outside thereof;

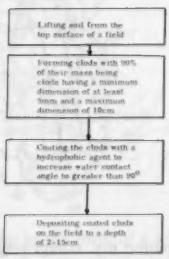


f. placing a suitable substrate in said plastic bag and placing said filter on the top rim of said collar and screwing said cap over both the filter and top of the plastic bag;
g. sterilizing and inoculating the contents of said bag;
h. growing a member selected from the group consisting of organisms, tissues and mycelia on said substrate;
i. removing said collar and said cap from said bag to provide a plastic bag containing said micro-organisms, tissues or mycelium and closing the top of said bag.

4,027,428
METHOD AND APPARATUS FOR CONSERVING SOIL WATER

Daniel I. Hillel, Rte. 1, Box 191-A, Barboursville, Va. 22923

Filed July 1, 1975, Ser. No. 592,246
Int. Cl.² A01N *7/02*
U.S. Cl. 47—58 **17 Claims**


Lifting soil from the top surface of a field
Forming clods with 90% of their mass being clods having a minimum dimension of at least 5mm and a maximum dimension of 10cm
Coating the clods with a hydrophobic agent to increase water contact angle to greater than 90°
Depositing coated clods on the field to a depth of 2-15cm

1. A process of conserving soil moisture in arid and semi-arid regions comprising the steps of:
a. forming the top soil said regions into a layer of independent clods, said layer having a depth in the range of 2 to 15 centimeters, at least 90% of the mass of said layer being clods ranging in size from 5 millimeters in minimum dimension to ten centimeters in maximum dimension;
b. coating the exposed grain surfaces of each clod with a hydrophobic agent to increase the contact angle of water on the grain surface to an angle greater than 90°.

4,027,429
PLASTIC STARTER POT

Walter L. Georgi, 427 E. Judd St., Woodstock, Ill. 60098

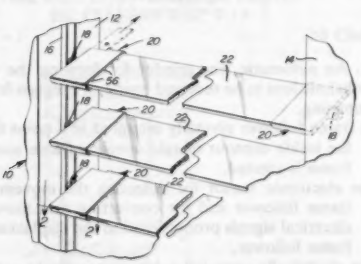
Filed Mar. 11, 1976, Ser. No. 666,008
Int. Cl.² A01G 9/10
U.S. Cl. 47—73 5 Claims

1. A starter pot for plants comprising the combination of
a pot having an aperture in the bottom wall, said aperture being spaced from the side walls of the pot and having an upturned lip around the periphery of the aperture so as to form an annular water reservoir space at the bottom of the pot,
means to prevent water from passing through said aperture comprising
bottom member covering said aperture and said reservoir space and detachable from the pot so that said bottom member can be pushed upwardly through the pot to remove a rooted plant therefrom without disturbing the soil in which the plant is rooted, said bottom member having at least one drain port to permit water to drain from the soil into said reservoir space,
and a continuous annular rim depending from said bottom member for fluid tight interfitting engagement with said upturned lip around the entire periphery thereof to block the escape of water from said reservoir space through the aperture in the bottom of the pot.

4,027,430
LOCKING JALOUSIE FRAME

Minoru Sakamoto, 3911 Nioi Place, Honolulu, Hawaii 96816

Filed Apr. 27, 1976, Ser. No. 680,798
Int. Cl.² E06B 7/084
U.S. Cl. 49—403 8 Claims

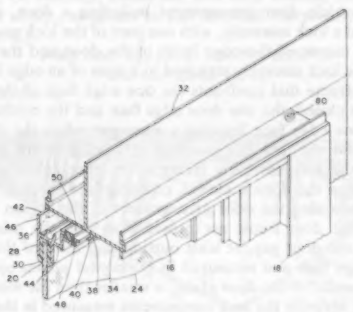


1. A locking jalousie frame, comprising, in combination:
a. a pair of longitudinally extending, spaced, substantially parallel side rails;
b. a cover assembly attached to one of the side rails and including a sheath provided with a socket, the socket being provided with an end wall disposed adjacent the associated side rail, an open end forming an entrance to the socket, a pair of edge walls extending substantially perpendicularly from the end wall to the open end, and a pair of substantially planar side walls connected to the end wall and edge walls;
c. a slat having a pair of longitudinally spaced ends with one of the ends being disposed in the socket provided in the sheath for retention by the sheath; and
d. a filler member removably disposed in the socket provided in the sheath between the one of the ends of the slat and the associated side rail for spacing the slat from the side rail, the sheath being further provided with a cut-out portion on one of the edge walls, with the cut-out portion extending from the end wall toward the open end and forming a passage for inserting the filler member into and out of the socket provided in the sheath when the end of the slat is disposed in the socket so as to block the open end of the socket.

4,027,431
SINGLE HUNG WINDOW WITH REMOVABLE FIXED LITE

Troy D. Rackard, Lexington, N.C., assignor to National Gypsum Company, Buffalo, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,739
Int. Cl.² E05D 15/16
U.S. Cl. 49—458 10 Claims

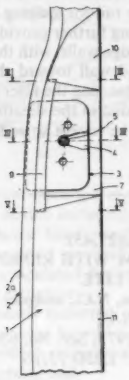


1. A window comprising a rectangular frame and an upper sash and a lower sash mounted in said frame, said upper sash being mounted above and outwardly of said lower sash, said frame consisting of a horizontal head member, a horizontal sill member, a pair of vertical jamb members and being free of any horizontal member between said head member and said sill member, said lower sash being removably mounted in said pair of vertical jamb members for vertical sliding movement relative to said vertical jamb members, said upper sash being removably mounted on said pair of vertical jamb members and said head member, said upper sash having a top horizontal member, said upper sash top horizontal member and said head member having cooperative interlocking members adapted to vertically hold said upper sash against said head member when said upper sash is vertically mounted in said frame and adapted to permit relative vertical movement of said upper sash when said upper sash is tilted by moving the bottom of said upper sash inwardly, a fastener disposed at the lower portion of each vertical member of said upper sash connecting and holding said lower portion of each vertical member in fixed position relative to the respective adjacent vertical jamb member, said fastener being adapted for readily disconnecting of said lower portion of each vertical member from said respective vertical jamb member, and cooperative means on the lower horizontal member of said upper sash and on the upper horizontal member of said lower sash for sealing the juncture of said sashes when said slidable lower sash is fully lowered.

4,027,432
DOOR ARRANGEMENT FOR A VEHICLE

Horst Klebba, Weyhausen, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed June 2, 1975, Ser. No. 582,582
Claims priority, application Germany, July 15, 1974, 2433895
Int. Cl.² E06B 3/14
U.S. Cl. 49—503 4 Claims

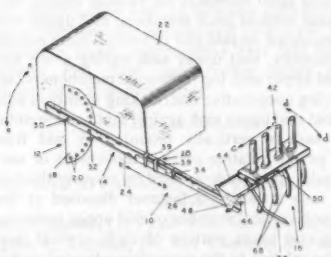


1. A vehicle door arrangement including a door, a door frame and a lock assembly, with one part of the lock assembly attached to one of the edge faces of the door and the other part of the lock assembly attached to a zone of an edge face of the door frame that confronts the one edge face of the door when it is closed, the one door edge face and the confronting door frame edge face forming a door gap when the door is closed, and the lock components pertaining to the diverse parts of the lock assembly facing each other at certain distances when the door is closed, characterized in that, means for dimensioning the door arrangement in the region of the zone of the door frame are provided so that the minimum width of the door gap, at least outside said zone of the door frame edge face and measured in horizontal planes approximately parallel to the door plane, is smaller than the minimum distances between the lock components measured in the same directions.

4,027,433
SAND BLASTING APPARATUS

Wayne Hockett, 1905 N. 43rd, Tampa, Fla. 33605

Filed Sept. 17, 1975, Ser. No. 614,191
Int. Cl.² B24C 3/32
U.S. Cl. 51—410 6 Claims

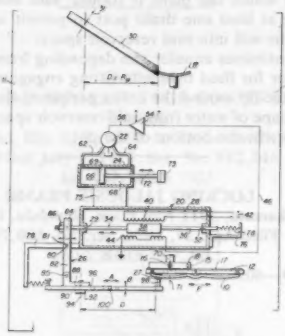


1. An abrasive cleaning apparatus configured for use in combination with fluid medium pressure source, said abrasive cleaning apparatus comprising a base means for mounting said abrasive cleaning apparatus on a platform, an adjustable nozzle support means interconnected to said base means by interconnecting boom means, said adjustable nozzle support means including a first positioning means to pivotally adjust said adjustable nozzle support means in a first plane relative to said base means and a second positioning means coupled to said first positioning means to pivotally adjust said adjustable nozzle support means in a second plane relative to said base means, said first positioning means comprising a first and second element held in fixed relationship relative to one another by a pair of end members disposed at opposite ends thereof, said first positioning means being pivotally attached to the outer portion of said interconnecting boom means, said second positioning means comprises a frame including a plurality of apertures formed therein to receive a corresponding plurality of nozzles to fix said nozzles in fixed spaced relationship relative to one another, said second positioning means being coupled at substantially the mid-point thereof to the outer end member of said first positioning means to permit pivotal movement relative to one another, said second positioning means further includes a handle means fixedly attached thereto such that the weight of said nozzles is supported by said interconnecting boom means to permit movement of said adjustable nozzle support means in said first and second planes.

4,027,434
EDGING APPARATUS FOR OPHTHALMIC LENS

Fred A. Haddock, Muskogee, Okla., assignor to Coburn Optical Industries, Inc., Muskogee, Okla.

Continuation of Ser. No. 364,287, May 29, 1973, abandoned.
This application July 15, 1975, Ser. No. 598,491
Int. Cl.² B24B 13/00
U.S. Cl. 51—101 LG 13 Claims



1. An automatic lens grinder for forming the edge of an ophthalmic lens to be received inside an eyeglass frame socket comprising,

a frame follower pivotally mounted at a point for tracking the inside contour of said eyeglass frame socket as said frame is rotated,

an electronic sensor for detecting the movement of said frame follower and for converting said movement into electrical signals proportional to the displacement of said frame follower,

an electrically operated valve responsive to said electrical signals for controlling a fluid output,

an actuator responsive to said fluid output,

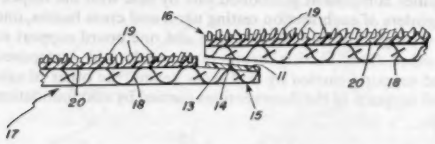
a grinding wheel for shaping the peripheral contour of said ophthalmic lens, and

means to rotate said lens with said socket and second means causing said follower to follow in said socket the corresponding point of contact that said lens makes with said grinding wheel.

4,027,435
COATED ABRASIVE ARTICLE CONTAINING A POLYURETHANE ADHESIVE SPLICE

John F. Malloy, Albany, N.Y., assignor to Norton Company, Worcester, Mass.

Continuation-in-part of Ser. No. 630,653, Nov. 10, 1975, abandoned, which is a continuation of Ser. No. 369,482, June 13, 1973, abandoned, which is a continuation-in-part of Ser. No. 253,570, May 15, 1972, Pat. No. 3,872,629, which is a continuation-in-part of Ser. Nos. 34,105, May 4, 1970, abandoned, and Ser. No. 233,572, March 10, 1972, Pat. No. 3,763,604, which is a continuation-in-part of Ser. No. 103,148, Dec. 31, 1970, abandoned, and Ser. No. 822,934, May 8, 1969, abandoned. This application June 14, 1976, Ser. No. 695,381
Int. Cl.² B24D 11/06
U.S. Cl. 51—295 1 Claim

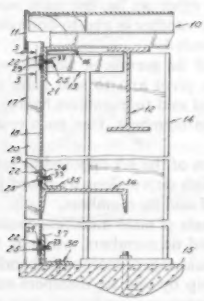


1. Coated abrasive article comprising a backing member and having abrasive grain adhered thereto by an adhesive bond, said article having two ends thereof joined together by means of a layer of an adhesive composition which in its initial state is a preformed adhesive film which has been at least partially cured but which can still be activated at a temperature suitable for splicing said ends together, said adhesive film being the reaction product of an adhesive composition comprising in admixture:
   a. a hydroxy terminated polyurethane-polyester having a hydroxyl number of from about 2 to about 15;
   b. an active hydrogen component containing at least difunctional active hydrogen and having an active hydrogen equivalent weight in the range of from 27 to less than about 500;
   c. a component having available free isocyanate groups; and
   d. a component selected from the group consisting of chlorinated aliphatic hydrocarbon, chlorinated aromatic hydrocarbon, alkylated polystyrene, and mixtures thereof, said component being miscible with components (a), (b) and (c).

4,027,436
EXPLOSION VENTING WALL STRUCTURE WITH RELEASABLE FASTENER MEANS

Edwin A. Daly, Southfield, Mich., assignor to Walcon Corporation, Ecorse, Mich.

Filed Mar. 15, 1976, Ser. No. 666,926
Int. Cl.² E04H 9/02, 9/14
U.S. Cl. 52—1 10 Claims

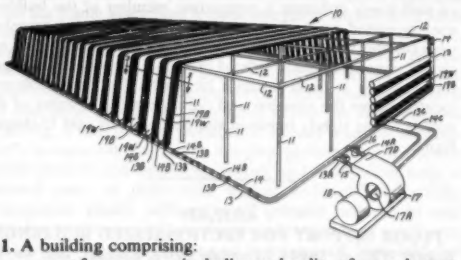


1. In a building structure, the combination comprising:
   a. a fixed building structure having an opening in the exterior of the building;
   b. a releasable venting wall panel for enclosing said opening in the fixed building structure and being provided with a plurality of attachment holes;
   c. a plurality of releasable fastener means solely attaching said releasable venting wall panel to said fixed building structure and including;
      b. a fastener member disposed at each of said holes in said releasable venting wall panel on the exterior side thereof and having arm means extending radially outward and overlapping the exterior edge of the adjacent hole; and,
      b. retainer means for each of said fastener members extended through the adjacent hole in the releasable venting wall panel and attached to the fixed building structure, whereby when an internal explosion occurs inside the fixed building structure and generates a predetermined force of the releasable wall venting panel, the releasable venting wall paner will be forced outward away from the fixed building structure and the arm means on all of the fastener member will be folded over simultaneously to permit each fastener member to pass through the adjacent hole in the releasable venting wall panel and completely detach the releasable venting wall panel from the fixed building structure.

4,027,437
INFLATABLE BUILDING

Jeffrey N. Monsky, Louisville, and Glen Combs, La Grange, both of Ky., assignors to The McMiah Corporation, Louisville, Ky.

Filed Nov. 26, 1975, Ser. No. 635,718
Int. Cl.² E04B 1/345
U.S. Cl. 52—2 10 Claims



1. A building comprising:
   a. support frame means including a plurality of spaced-apart upright first frame means having their lower ends anchored to base means and having their upper ends interconnected to a grid formed of plural spced-apart second frame members;
   b. first and second manifold means mounted adjacent to the periphery of said support frame means and each having an inlet and plural outlets, with their inlets being respectively fluid-connected to a source of pressurized fluid through separate first and second control valve means and with the plural outlets of said first manifold means being offset from the plural outlets of the second manifold means; and
   c. covering means for covering said support frame means including two groups of plural inflatable hollow tubular members which extend across said frame means generally parallel to one another, with all members of a first group of said two groups being substantially opaque about their entire tubular peripheries and fluid-connected to the outlets of said first manifold means and all members of a second group of said two groups being substantially translucent and fluid-connected to the outlets of said second manifold means and with one member of each of said groups being located contiguous to one member of the other of said groups such that the amount of light that can

be transmitted through said covering means can be selectively varied through operation of said valve means.

4,027,438

TRANSVERSE FRAME OF INDUSTRIAL BUILDING CARCASS

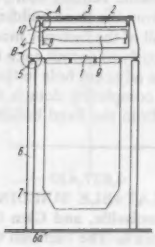
Alexandr Tikhonovich Shemonaev, Ochakovskoe shosse 13, korpus 2, kv. 17; Dmitry Grigorievich Cherny, Nizhnyaya Krasnoselskaya, 45, kv. 116; Semen Naumovich Genis, Krjukovskaya ulitsa, 23, kv. 33, and Igor Konstantinovich Vishnitsky, Festivalnaya ulitsa, 19, kv. 71, all of Moscow, U.S.S.R.

Filed June 11, 1975, Ser. No. 585,825

Claims priority, application U.S.S.R., June 13, 1974, 2037025

Int. Cl.² B66C *5/02*

U.S. Cl. 52—27 **3 Claims**



1. A transverse frame of an industrial building carcass comprising: lower columns, upper columns, a crossbar mounted on said lower columns; a supporting member of the building roof mounted on said upper columns above said crossbar wherein the upper columns located above the crossbar are rigidly connected with the said crossbar, forming a U-shaped frame which is fixed through hinges to the lower columns located below the crossbar and the supporting member of the roof is thrust tightly between the free ends of said U-shaped frame.

4,027,439

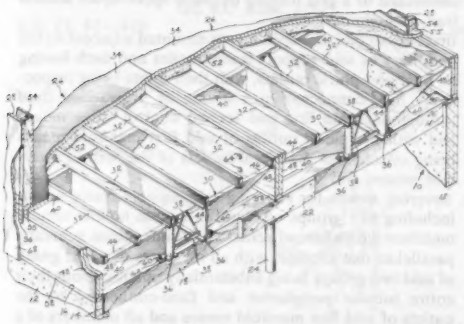
FLOOR SUPPORT FOR SECTIONALIZED BUILDINGS

Robert Willard, 56044 Riverdale Drive, Elkhart, Ind. 46514

Filed Aug. 10, 1976, Ser. No. 713,297

Int. Cl.² E04B *5/14*; E04C *3/292*

U.S. Cl. 52—79.1 **5 Claims**



1. In a sectionalized building having two joining components, each component including a floor section and side walls, a ground supported foundation, each building component carried upon said foundation, the improvement wherein said foundation includes side walls, a plurality of parallel spaced cross beams each carried by and extending from one said foundation wall to the other, each floor section including:

a girder extending longitudinally of the floor section, said girder including a center beam part and a plurality of longitudinally spaced cantilevered transverse gussets extending from opposite sides of said beam part and terminating at reduced end portions, spaced joists carried upon said gussets paralleling the beam part of said girder and having upper surfaces lying in approximately the same plane, a pair of spaced board supports each paralleling said joists at the end portions of said girder gussets, each board support extending from the plane of said joist upper surfaces to approximately the level of the bottom of said girders, flooring applied over said joists and board supports,

said floor section of one component and said floor section of the other component positioned side by side with the respective girders of each section resting upon said cross beams, one board support of one floor section and one board support of the other floor section being juxtaposed, said juxtaposed board supports carried by said cross beams, the other of said board supports of the floor sections carried by said foundation walls.

4,027,440

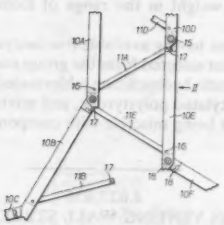
EXTENSIBLE INTERLOCKING STRUCTURE OF MULTI-LATERAL CROSS-SECTION

Leslie Frank Hamblin, Shrewsbury, England, assignor to Alan Salisbury Lamburn, Kencott, England, a part interest

Filed July 22, 1975, Ser. No. 598,039

Int. Cl.² E04H *12/18*

U.S. Cl. 52—108 **10 Claims**



1. An extensible interlocking structure of multi-lateral cross-section comprising

two sets of main members, at least one set consisting of generally rectangular rigid frames which lie in a first plane spaced apart from a second plane in which the members of the other set lie, the main members of each set engaging one another in end-to-end relation when the structure is extended,

at least one set of tie members, said tie members being pivoted about a pivot axis to said main members of at least one set, and said tie members having, before extension of the main members, free ends remote from said pivot axis,

said main members of the set opposed to said tie members being formed with depressions to afford jaws to receive the free ends of said tie members,

extension of said sets of main members causing said jaws to close to grip said tie members, whereby to form a rigid structure with said sets of main members held in spaced-apart relationship by said tie members extending diagonally therebetween,

and a member interconnecting the free ends of both sets of main members.

4,027,441

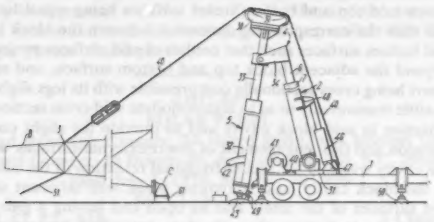
ARRANGEMENT FOR ERECTING AND DISMOUNTING AN ELONGATE OBJECT HAVING ONE END ARTICULATED TO A FOUNDATION

Grigory Vasilievich Pitelyaev, Moskovskoi oblasti, shosse Entuziastov 37, kv. 49, Balashikha; Evdokim Semenovich Telpukhovsky, Sadovo-Samotechnaya ulitsa 7, kv. 75, Moscow; Boris Iosifovich Ravin, Schelkovskoe shosse 65, kv. 15, Moscow, and Alexei Grigorievich Gladkov, Chongarsky bulvar 1, kor. 2, kv. 153, Moscow, all of U.S.S.R.

Filed Oct. 2, 1975, Ser. No. 619,031

Int. Cl.² E04H *12/34*

U.S. Cl. 52—116 11 Claims



1. An arrangement for erecting and dismounting an elongated heavy object having one end articulated to a foundation, comprising: a chassis which is stationary during the reaction or dismounting of an object; a boom having two ends, one end being a distal end and the other end being articulated to said chassis; a load gripping member mounted for displacement towards the distal end of said boom during the installation of an object; an additional boom support for supporting said boom, said additional boom support being articulated to the distal end of the boom and being placed on the ground during the installation of an object; means for effecting said displacement of the load gripping member.

4,027,442

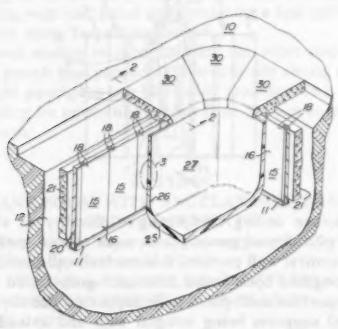
METHOD OF CONSTRUCTING SWIMMING POOLS

Herman Silverman, Doylestown, Pa., assignor to KDI Sylvan Pools, Inc., Doylestown, Pa.

Continuation-in-part of Ser. No. 511,533, Oct. 3, 1974, abandoned. This application Feb. 18, 1976, Ser. No. 659,032

Int. Cl.² E04H *3/16;* E04G *23/00*

U.S. Cl. 52—309.4 5 Claims



1. The method of constructing a swimming pool which comprises

assembling a static structure comprising a plurality of metallic components having flat vertically disposed interior faces providing an interior exposed wall surface around the perimeter of the pool with a potentiality for water leakage therethrough,

spraying a foamable synthetic plastic material in liquid form towards said wall surface for adherence thereto of at least on layer of stabilized foam with a hardened exterior skin, and

applying an ultraviolet protective material to the exterior skin.

4,027,443

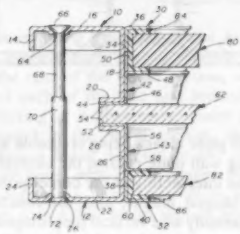
FIRE AND IMPACT RESISTANT WINDOW ASSEMBLY

Robert L. Briggs, Anaheim, Calif., assignor to Aneomstat Products Division, Dynamics Corporation of America, Scranton, Pa.

Filed Oct. 14, 1975, Ser. No. 621,664

Int. Cl.² E04C *2/54;* E06B *3/26*

U.S. Cl. 52—202 4 Claims



1. A fire, impact resistant and tamper proof window assembly comprising a multi-part centrally open marginal frame, said frame including part interconnecting means operable with the frame assembled to preclude frame disassembly from one side thereof and said frame having spaced apart first, second and third inwardly facing grooves disposed respectively in outer, inner and outer relationship with the frame assembled, a pane of fire glass with marginal portions secured in said inner groove and extending across the frame central opening, a first pane of deflectable impact resistant substantially transparent plastic with marginal portions secured in one outer groove and extending across said central opening, a second pane of deflectable impact resistant substantially transparent plastic with marginal portions secured in said other outer groove, said plastic panes being at least one fourth (¼) of an inch in thickness and being spaced from said fire glass pane a distance of at least one fourth (¼) of an inch whereby to avoid breakage of said fire glass pane on impact and resulting inward deflection of said plastic panes toward the fire glass, and said plastic panes being formed of a material with high impact resistance characteristics at least similar to that of polycarbonate so that impact on either of said panes may deflect the pane but not rupture the fire glass, and said material having a relatively low melting point such that fire on one side may melt or deform the plastic on said one side but leave the opposite plastic pane intact due to the protection of the fire glass.

4,027,444

FIRE-RESISTANT WALLS FOR USE IN SHIPBUILDING

Adolf Berg, Niendorfer Hohe 9, 2000 Hamburg 61, Germany

Continuation of Ser. No. 515,981, Oct. 18, 1974, abandoned. This application Dec. 17, 1975, Ser. No. 641,556

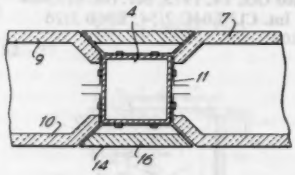
Claims priority, application Germany, Oct. 19, 1973, 2352444

Int. Cl.² E04H *1/00*

U.S. Cl. 52—240 6 Claims

1. A fire-resistant wall for ships and assemblable from construction components comprising, in combination, wall plate means having two covering panels; fire-resistant means be-

tween said covering panels, said covering panels having vertical edges shaped into integral profiles and having slits; vertical support means for supporting said wall plate means, said vertical support means being substantially less in width than said wall plate means, said profile shaped vertical edges being angularly bent and directed inward toward the interior of said wall plate means for contacting directly corners of said vertical support means, said angularly directed vertical edges for contacting said vertical support means being spaced by a distance substantially equal to the width of said vertical support means; hook means on said vertical support means and inserted into said slits, said vertical support means comprising multi-cornered pipe-shaped means, each surface of said pipe-shaped means having a predetermined number of said hook

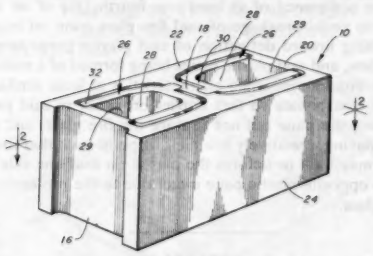


means, said wall plate means being erectable at varying angles to a neighboring wall plate means, the central axis of all said wall plate means intersecting at the center point of said multi-cornered pipe-shaped means; said fire-resistant means surrounding substantially said vertical pipe-shaped means; profile rail means open on one side and covering the free edges of said vertical support means; said rail means being spaced from said vertical support means and spanning the space between angularly inward directed vertical edges of adjacent covering panels, the outer surface of said rail means being substantially flush with the outer surface of said covering panels; said rail means forming an internal space with said angularly inward directed vertical edges and said vertical support means; said fire-resistant material filling said internal space.

4,027,445
INSULATED BLOCK

David L. Nickerson, Wilbraham, Mass., assignor to Korfil, Incorporated, Chicopee, Mass.

Filed Dec. 4, 1975, Ser. No. 637,641
Int. Cl.² E04B *1/88, 2/08*
U.S. Cl. 52—405 **6 Claims**

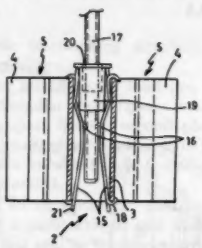


1. The combination of a preformed building block of concrete and at least one preformed generally U-shaped open ended insulating insert therefor; said block having generally parallel and planar top and bottom surfaces with at least one top-to-bottom through cavity of generally rectangular cross section, said block also having opposite generally parallel side sections and at least two transverse webs of substantially uniform thickness extending between said side sections, integral at opposite ends with the side sections and defining said cavity in cooperation with said side sections, the said generally rectangular cross sectional configuration and dimensions of said cavity being subject to variation within a significant range during manufacture, said insert being of a light weight cellular heat insulating and fire retardant material and having an external configuration which is generally rectangular and adapted to enter said cavity in the block, the insert when so entered having its connecting portion extending along and engaging one of said webs, its opposite legs extending along and respectively engaging said opposite side sections of the block, and its open end and the end surfaces of its legs adjacent the opposite web, the insert thus being disposed with top and bottom surfaces of its legs and connecting portion adjacent and substantially parallel respectively with said block top and bottom surfaces and defining a second and somewhat smaller top-to-bottom through cavity within itself, and the dimension between said top and bottom insert surfaces being equal to or less than the corresponding dimension between the block top and bottom surfaces such that neither of said surfaces projects beyond the adjacent block top and bottom surface, and said insert being cross sectionally compressible with its legs slightly flexible transversely so as to accommodate said cross sectional variation in said block cavity and to provide for slight compression and firm engagement of insert external surfaces with the cavity wall and for secure frictional retention of the insert in the block cavity, said transverse block web adjacent said end surfaces of the insert and its open end having a pair of similar top-to-bottom through slots extending respectively adjacent said leg end surfaces, and said insert legs being sufficiently long and flexible respectively to enter said slots, said transverse block web adjacent said connecting web also having a top-to-bottom through slot, said insert having an integral external top-to-bottom extending projection on its said connecting portion entering said slot, and each of said slots having a depth at least one fourth (¼) the thickness of its web, so as to locally reduce the web thickness, a width at least three fourths (¾) of an inch, and a total volume equal to at least one fourth (¼) the volume found by multiplying web thickness times web height times the width at the mouth of the slot.

4,027,446
SUSPENDED SCREEN CEILING

Johannes Antonius Henricus Brugman, Rotterdam, Netherlands, assignor to Hunter Douglas International N.V., Willemstad, Curacao, Netherlands Antilles

Division of Ser. No. 459,805, April 10, 1974, Pat. No. 3,950,909. This application Dec. 10, 1975, Ser. No. 639,476
Claims priority, application Netherlands, Apr. 13, 1973, 7305185
Int. Cl.² E04B *5/52*; E06B *3/54*
U.S. Cl. 52—484 **5 Claims**



1. A screen ceiling comprising a plurality of elongated panels, a plurality of gusset joints, each of said gusset joints having a central wall portion, said central wall portion defining an elongated open ended tube each gusset joint having a panel support for each panel to be supported thereby, each of said panel supports being integral with and extending outwardly from the wall portion of its associated gusset joint, each of said panels having a portion adjacent an end thereof lying against a panel support, an opening in said portion of each of said panels and intermediate the length thereof that lies against said support, a projection integral with each of said supports and extending laterally of their associated support

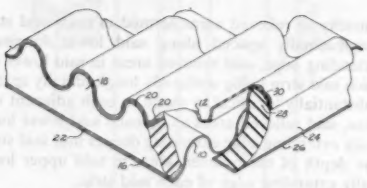
from intermediate the length thereof, each said projection extending through the opening of a panel lying against said associated support, a locking member for each of said openings, said locking members each being engaged with a projection on the opposite side of a panel from the panel's associated support and bearing against a face of said panel for securing said panel between said panel support and said locking member, each of said locking members having a locking element for positively locking said member in place other than solely by friction, said gusset joints being suspended from an overlying fixed support by means in engagement with said tube and secured to said fixed support, said means being generally elongated, the longitudinal axis of said means being substantially in alignment with the axis of said tube, and the axes of said means and said tube being generally parallel with the major planes of said panels.

4,027,447

SOLAR PANEL

Floyd Randolph Granger, 24 Heard Drive, and Michael Gerard Granger, 10 Delores St., both of Greenville, S.C. 29605

Filed July 1, 1976, Ser. No. 701,899
Int. Cl.² E04B *2/28*
U.S. Cl. 52—618 **3 Claims**



1. A panel structure for being mounted on the roof of a building for permitting solar energy to pass therethrough into said building, said structure comprising:

a. a first translucent panel having sinusoidal corrugations running continuously across said panel in a first direction;

b. a second translucent panel having sinusoidal corrugations running continuously across said second panel substantially perpendicular to said first direction, said second panel being positioned on top of said first translucent panel;

c. means for securing said panels together;

d. first sealing members interposed between said first and said second panel, upper surfaces of said sealing members being complementary in shape with said corrugations for mating with said panel and producing a seal between said panels along two edges thereof;

e. second sealing members sealing the other two edges of said panels thus producing a structurally strong and lightweight panel that can be readily mounted on a roof of a building for permitting energy from the sun to pass therethrough.

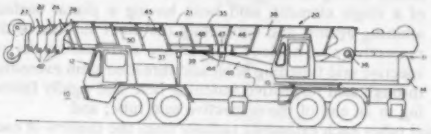
4,027,448

CRANE BOOM WITH ANGULAR SIDE FRAME REINFORCEMENTS

Bohdan Tymciurak, Naperville, Ill., assignor to Clark Equipment Company, Buchanan, Mich.

Filed June 16, 1975, Ser. No. 587,523
Int. Cl.² E04G *25/00;* **E04H** *12/34*
U.S. Cl. 52—632 **6 Claims**

1. For a large material handling apparatus comprising a telescoping crane boom assembly having two or more extensible and retractable sections, each section comprising a longitudinal top plate, a pair of side webs extending downwardly from opposite longitudinal edges of the top plate and appropriately secured thereto, a bottom plate appropriately secured to the lower edges of the side webs to provide a lower or compression flange and to close the boom section, and web stiffeners rigidly secured to the side webs in longitudinally spaced relation and extending between the top and bottom plates of the boom section, an arrangement of web stiffeners mounted on each side web of each extensible and retractable boom section, the arrangement comprising first and second pluralities of web stiffeners, each stiffener of the first plurality of web stiffeners being mounted on the web at a first angle of tilt in longitudinally spaced relation and directed toward the front of the boom section, each stiffener of the second plural-



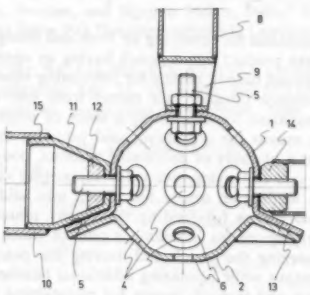
ity of web stiffeners being mounted on the web at a second angle of tilt in longitudinally spaced relation and being directed toward the rear of the boom section, with the innermost stiffener of each of the first and second pluralities of stiffeners intersecting at a changeover point generally provided at a midpoint of the boom section, the apex of the intersecting stiffeners being directed to the compression or lower flange of the boom section, the changeover point generally corresponding to the changeover from positive to the negative shear in a movable boom section under cantilever end loading.

4,027,449

SYSTEM FOR CONSTRUCTING SPATIAL STRUCTURES

Francisco-Javier Alcalde Cilveti, Plaza Conde Rodezno,, 8-4° Pamplona (Navarra), Spain

Continuation of Ser. No. 328,078, Jan. 30, 1973, abandoned. This application May 13, 1976, Ser. No. 686,233
Int. Cl.² E04H *12/06*
U.S. Cl. 52—648 **6 Claims**



1. In a spatial structure including a plurality of hollow hubs or nuclei joined by a plurality of struts or tubes attached at the opposite ends thereof to adjacent of said nuclei, the improvement comprising:

each of said nuclei being substantially sperically shaped;

each of said nuclei being formed of a first hollow partial spherical piece having an opening and a second hollow partial spherical piece having an opening, said first piece having a height different from that of said second piece, each of said pieces having annular fins extending outwardly from said respective openings in a radial direction from the center of said nucleus;

said pieces being aligned with said respective fins abutted together to form the respective substantially spherical nucleus having a completely hollow and empty interior,

said abutted fins being rigidly fixed together by screw means, said thus abutted and fixed fins forming flange means for stiffening said nucleus against deformation stresses;

each of said pieces of each of said nuclei having therein a plurality of fastening holes, said nuclei each having on the exterior thereof, around each of said fastening holes, a flat annular surface formed in said nuclei;

bolt fastening means for rigidly attaching each of said tubes at both said ends thereof to said nuclei at said fastening holes in said pieces thereof, each said bolt fastening means having an integral head and threaded stem formed of a single element, said head having a planar surface abutting against and contacting the inner surface of the respective said nucleus at positions surrounding the respective said fastening hole, said threaded stem extending through said respective fastening hole and rigidly fastening to an end of the respective said tube; and

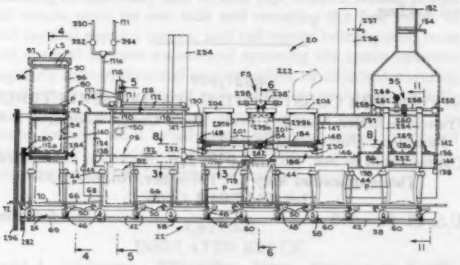
said tubes each extending radially from the centers of each of the nuclei attached thereto.

4,027,450

POUCH FILLING UNDER AIR EXCLUSION

Tony T. Chiu, Los Gatos, and Jurgen H. Strasser, Mountain View, both of Calif., assignors to FMC Corporation, San Jose, Calif.

Filed Jan. 19, 1976, Ser. No. 650,348
Int. Cl.² B65B *31/04*
U.S. Cl. 53—112 B **18 Claims**



1. An apparatus for removing air from and filling a substantially air-free product into a pouch having an open end comprising: a steam tunnel, means for circulating steam at atmospheric pressure through said tunnel from one end to the other, a magazine for supporting a stack of empty pouches, conveying means for advancing said pouches through said tunnel past a plurality of processing stations, pouch carrying means on said conveying means for supporting said pouches means for feeding an empty flat pouch into said conveying means, said means for feeding the empty pouch into said pouch carrying means including a pair of pinch rollers for firmly squeezing the pouch and moving the pouch into the carrying means while squeezing additional headspace air out of the open end thereof, means for maintaining said empty pouch fed to said feeding means closed until after advancement into the tunnel, means for opening said pouch on said conveying means after said pouch has entered said steam tunnel, filling means for discharging a substantially air-free product into said open pouch, and means within said steam tunnel for sealing said pouch.

4,027,451

FREE FLOW GRATING

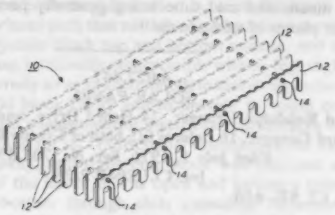
Leopold Bustin, Emmans Road, Flanders, N.J. 07836

Filed Mar. 30, 1976, Ser. No. 671,833
Int. Cl.² E04C *2/42*
U.S. Cl. 52—664 **3 Claims**

1. A free flow grating comprising:

a plurality of longitudinally extending grating strips, each of said grating strips including an upper longitudinally extending edge and a lower longitudinally extending edge spaced from and generally parallel to said upper longitudinally extending edge, a first end edge generally normal to and extending between said upper and lower longitudinally extending edges, a second end edge, spaced from and generally parallel to said first end edge and extending between said uper and lower longitudinally extending edges, first and second generally parallel side surfaces, the perimeter of said side surfaces generaliy being defined by said upper and lower longitudinally extending edges and said first and second end edges;

a plurality of relieved areas formed in each said strip and longitudinally spaced along said upper longitudinally extending edge;



a plurality of relieved areas formed in each said strip and longitudinally spaced along said lower longitudinally extending edge, said relieved areas in said lower edge of each said strip being uniformly longitudinally spaced and substantially identical in shape to each adjacent relieved area, said relieved areas along each said lower longitudinally extending edge extending deeper into said strip than the depth of the relieved areas in said upper longitudinally extending edge of each said strip;

said plurality of grating strips positioned longitudinally such that the relieved areas in the lower longitudinally extending edge of adjacent grating strips are not in alignment; and

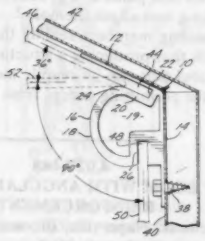
securing means for rigidly securing said plurality of grating strips together and in general parallel relationship.

4,027,452

EXTRUDED INTERIOR MOLDING

James W. Donnell, 945 W. 190th St., Gardena, Calif. 90247

Filed Apr. 19, 1976, Ser. No. 677,978
Int. Cl.² E04F *19/02, 13/00*
U.S. Cl. 52—716 **8 Claims**



1. An inside corner molding formed by tubular extrusion comprising:

a first flat flange member;

a second flat flange member coextensive therewith at an included angle thereto of from 90° to about 130°;

a bulbous, hollow-form section formed with a curvilinear wall, coextensively carried on said first flange and having a tangential side wall parallel to and opposite said second flange contiguous with said curvilinear wall and spaced

apart therefrom to define a longitudinal channel therebetween having a curvilinear, diverging entrance;

a longitudinal rabbet groove in the opposite side wall of said bulbous, hollow-form section coextensive with, parallel to and spaced apart from said first flange member.

4,027,453

JOINT CONSTRUCTION FOR CONNECTING TOGETHER TWO FRAME MEMBERS

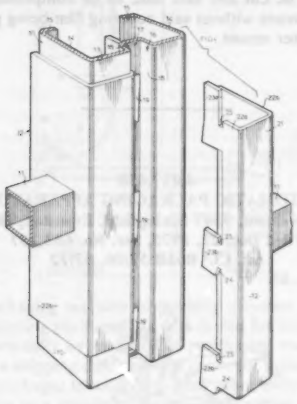
Donald John Henry Bridge, Birmingham, England, assignor to Finspa Engineering Co. Limited, West Bromwich, England

Filed Oct. 9, 1973, Ser. No. 404,588

Claims priority, application United Kingdom, Nov. 23, 1972, 54276/72

Int. Cl.² A47F 5/10; F16B 2/00

U.S. Cl. 403—353 **2 Claims**



1. A joint construction for connecting together two frame members wherein:

a. a first of said frame members has opposite side limbs connected by a base so that the side limbs and base collectively define a trough-like shape,

b. said first frame member base having formed therein a re-entrant trough-shaped recess which extends longitudinally of the first frame member,

c. said recess including a base having a plurality of slots spaced longitudinally along the recess thereof, and contact elements disposed at the margins of the slots and projecting from the recess base in a direction away from a mouth of a re-entrant trough-shaped recess,

d. the second of said frame members being of trough-shape and having a limb which comprises a plurality of hook-shaped tongue elements spaced longitudinally from one another,

e. said slots in the base of the re-entrant trough-shaped recess have mutually-inclined lateral margins so that each slot is wider at one end than at the other end thereof, said contact elements are similarly mutually inclined,

f. at least one of the tongue elements of the second frame member is inclined to a longitudinal axis of the second frame member,

g. the second trough-shaped frame member having an effective size to embrace the outer surface of one side limb, a part of the base of the first frame member and one side of the re-entrant trough-shaped recess formed therein,

h. said tongue elements are engaged in said slots with one of the tongue elements being in face-to-face wedging engagement with a respective one of said contact elements,

i. said wedging engagement being effective to hold the second frame member firmly in contact with the outer surface of said one side limb of the first frame member and to support the second frame member against downward movement relative to the first frame member.

4,027,454

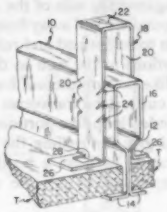
HOLD DOWN CLIP FOR CEILING TILE IN GRID-TYPE CEILING

Jerome T. Schuplin, Parma Heights, Ohio, assignor to Fastway Fasteners, Inc., Lorain, Ohio

Filed Feb. 27, 1976, Ser. No. 662,101

Int. Cl.² E04B 5/57

U.S. Cl. 52—714 **13 Claims**



1. A hold down clip for use with a grid-type ceiling embodying tile supporting members of inverted T cross section, said clip comprising a generally U-shaped clip body having spaced legs for engaging opposite sides of the vertical rib of an associated inverted T member, a foot portion on at least one of said legs adapted to overlie an underlying tile and hold the latter, tab means on said foot portion depending therefrom and substantially normal thereto for coaction with the tile to aid in maintaining the latter in position, and wherein said tab means terminates in a sharpened point means adapted to dig into an underlying tile for maintaining the tile in place.

4,027,455

PACKING CONTAINERS WITH RIPPING THREAD OPENING AND PACKING MATERIAL WEBS FOR THE MANUFACTURE OF THE PACKING CONTAINERS

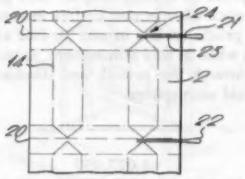
Ruben Rausing, Rome, Italy; Gert Nedstedt, Malmo, Sweden; Hakan Holmstrom, Loberod, Sweden; Lars-Erik Palm, Staffanstorp, Sweden, and Stjepan Stefan, Dalby, Sweden, assignors to Tetra Pak Developpement SA, Lausanne, Switzerland

Division of Ser. No. 331,886, Feb. 12, 1973, abandoned. This application Apr. 28, 1975, Ser. No. 572,092

Claims priority, application Switzerland, Mar. 14, 1972, 3691/72

Int. Cl.² B65B 61/18

U.S. Cl. 53—14 **8 Claims**



1. In a method of continuously producing containers from a web of carton forming material having a layer of thermoplastic material on that side which will form the inside of the container, which includes forming the web into a longitudinal tube-like member, sealing together the longitudinal edges thereof, filling the tube-like member with a filling material, forming spaced face-to-face seals transversely of the length of the tube-like member to form a plurality of interconnected containers and cutting through the transverse seals longitudi-

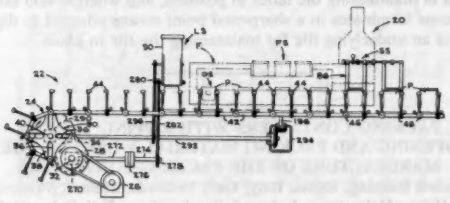
nally thereof to separate the packages from one another, the improvement comprising securing the substantially parallel legs of each of a plurality of substantially U-shaped tear threads to the layer of thermoplastic material at spaced locations along the length of the web and transversely thereof, the spaced locations of the parallel legs of each tear thread being juxtaposed the inner edge of the location where the transverse face-to-face seal is to be formed, the loop-like portion of each tear thread extending beyone one marginal edge of the web so that the inner portions of the parallel legs pass transversely through the longitudinal seal when sealing the edges of the web to form the tube-like member, folding the extended loop-like portions back against the side of the web which will form the outside of the container and away from the location where the transverse seal is to be formed and releasably securing the folded loop-like portions to the web so that each tear thread and extended loop-like portion thereof for each container will remain intact when cutting the transverse seals to separate the containers, the extended loop-like portions of each tear thread forming an external grip for pulling the thread to open the container by separating at least a portion of the adjacent face-to-face transverse seal to provide access to the filling material therein.

4,027,456

AIR-FREE POUCH PACKAGING METHOD

Donald C. Wilson, San Jose, Calif., assignor to FMC Corporation, San Jose, Calif.

Filed Jan. 19, 1976, Ser. No. 650,347
Int. Cl.² B65B *31/04*
U.S. Cl. 53—22 B **6 Claims**



1. A method of packaging a product in a substantially air-free pouch while moving the pouch through a plurality of processing stations in a tunnel comprising the steps of: receiving an empty pouch and maintaining the empty pouch closed, applying pressure to the pouch for flattening and squeezing headspace air out of the pouch, applying a vacuum about the pouch while pressure is being applied to the pouch to flatten the pouch, moving the closed pouch into the tunnel, maintaining an atmosphere of substantially air-free gas in the tunnel, opening the pouch when in said air-free atmosphere, filling the pouch with a product while in said air-free atmosphere, sealing the pouch when in said atmosphere, inducing said air-free gas to flow through the tunnel, and discharging the sealed pouch from said atomsphere.

4,027,457

FILM COVERED CUT ITEM AND PROCESS

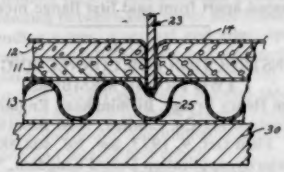
James J. Johnson, and David Y. Loeber, both of Louisville, Ky., assignors to David Y. Loeber and Harry B. O'Donnell, III, both of Louisville, Ky.

Continuation of Ser. No. 251,204, May 8, 1972, abandoned.
This application May 2, 1974, Ser. No. 466,137
Int. Cl.² B65B *63/00*; B26D *4/02*
U.S. Cl. 53—23 **10 Claims**

1. A process for cutting a film covered item without piercing its covering film comprising the steps of:

a. mounting an item on a compressible base and covering said mounted item and at least a portion of said base with resilient film and fastening said film to said portion of said base, and, thereafter,

b. contacting said mounted film covered item and said base



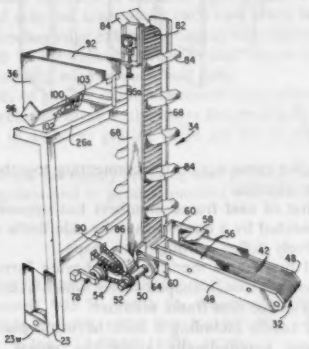
with cutter means under pressure and thus causing said item to be cut and said base to be compressed by said cutter means without said covering film being pierced by said cutter means.

4,027,458

AUTOMATIC PACKAGING APPARATUS

James A. Goodman, 9347 Springfield, Evanston, Ill. 60022

Filed Dec. 22, 1975, Ser. No. 643,257
Int. Cl.² B65B *57/06*, *57/12*
U.S. Cl. 53—55 **28 Claims**



1. An automatic packaging apparatus for packaging a product into a container, said apparatus comprising:

a horizontal feeder system for conveying a product thereon;

a vertical flite conveyor system coupled to the horizontal feeder system and positioned relative thereto for receiving the product therefrom;

a hopper coupled to the vertical flite conveyor and positioned relative thereto for receiving the product therefrom, the product being deposited into the container via said hopper;

an input conveyor system coupled to the vertical flite conveyor system and positioned so as to enable a container traversing said input conveyor system to be positioned under the hopper; and

electrical synchronizing means coupled to the vertical flite conveyor system and the horizontal feeder system enabling the synchronization of product flowing from the horizontal feeder system to the vertical flite conveyor system;

wherein the product arrives at the vertical flite conveyor system at a time when the vertical flite conveyor system is in a position to carry the product from the horizontal feeder system into the hopper.

4,027,459
SEALING MACHINE

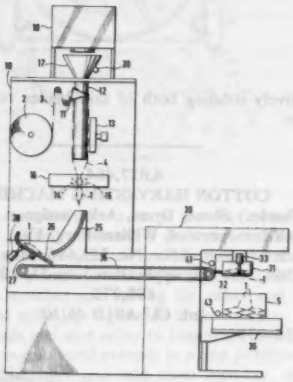
Antonius Nieskens, Nederweert; Petrus Slenders, Ospel, and Christian Palmkoeck, Weert, all of Netherlands, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Apr. 29, 1976, Ser. No. 681,481

Claims priority, application Germany, May 2, 1975, 2519645

Int. Cl.² B65B *57/20*

U.S. Cl. 53—59 R **2 Claims**



1. A packaging machine comprising a system for continuously fabricating packages and of a device for introducing the same sequentially by means of a positioning and deposition head into a shipping case and of a conveyor system for bringing these packages spaced from each other from the packaging machine to a shipping case loading machine,

characterized in that a barrier member is mounted adjacent to the starting end of said conveyor system from the packaging machine to the shipping case loading machine, said barrier member being brought into a substantially horizontal package retaining position whenever a given number of packages has passed a counter associated with the shipping case loading machine, said counter further effecting shut-down of the operation of the packaging machine and interrupting operation of the positioning and deposition head that loads packages into the shipping case.

4,027,460
COMMODITY PACKAGING SYSTEM

Brian Orr, Hoghton, near Preston, England, assignor to F. B. Mercer, Limited, England

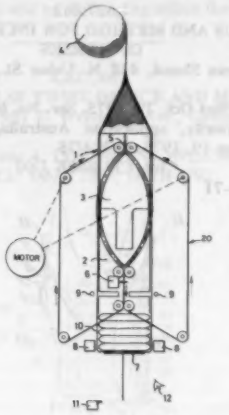
Filed Jan. 20, 1976, Ser. No. 650,777

Claims priority, application United Kingdom, Jan. 21, 1975, 2616/75

Int. Cl.² B65B *5/02, 9/10, 35/50*

U.S. Cl. 53—162 **2 Claims**

1. In an apparatus for forming commodity packages comprising an elongate vertically extending mandrel having a hollow feed portion with a product opening leading to the mandrel interior and a lower discharge end, drive means for passing a tubular flexible packaging material axially and downwardly along the mandrel while allowing commodities to be inserted into the mandrel interior through the product opening and transverse sealing means below the discharge end of the mandrel for forming transverse seals in the packaging tube, the improvement comprising a platform provided below the mandrel for lifting movement into an upper position in which the platform is situated within the hollow portion of the mandrel to lift a previously transversely sealed end portion of the packaging tube depending from the discharge end of the mandrel into the hollow portion of the mandrel and to allow a commodity or a stack of commodities inserted into the hollow portion through the product opening to be supported by the platform on an internal surface of said previously sealed end portion of the packaging tube and for lowering movement to withdraw from the mandrel to release the previously sealed end portion of the packaging tube with the included commodity or commodities from within the mandrel for subsequent transverse sealing of the tube above the commodity or commodities to form a package and means to move said platform upwardly into said mandrel and downwardly to withdraw from said mandrel.



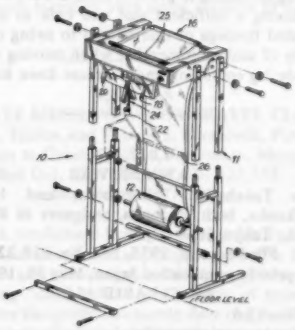
4,027,461
FLOATING HOOK ARRANGEMENT FOR AN APPARATUS FOR BAGGING GARMENTS

Murray Jelling, Roslyn Heights; Alexander Kahn, Massapequa; Ernest George Moore, East Meadow, and Michael Friedman, Brooklyn, all of N.Y., assignors to U.S. Dynamics Corporation, Amityville, N.Y., a part interest

Filed July 22, 1976, Ser. No. 707,653

Int. Cl.² B65B *43/26, 67/04*

U.S. Cl. 53—241 **13 Claims**



1. A floating hook arrangement for use in an apparatus for bagging garments, said apparatus having means for supporting said floating hook arrangement, said arrangement comprising a central elongated shaft having a first end and a second end spaced from said first end; a hook mounted on said central elongated shaft at said first end for supporting a garment thereon; means at said second end for mounting said central elongated shaft on said means for supporting said floating hook arrangement; and a spreader unit on said shaft and having a first end adjacent said means for mounting said cen-

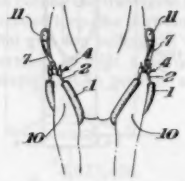
tral shaft, and a second end spaced from the latter said first end toward said first end of said central elongated shaft and engaged with said central elongated shaft.

4,027,462

APPARATUS AND METHOD FOR INCREASING SPEED OF HORSES

Kenneth James Shand, 418 N. Union St., Wilmington, Del. 19805

Filed Oct. 29, 1975, Ser. No. 626,768
Claims priority, application Australia, Oct. 30, 1974, 9421/74; May 19, 1975, 81314/75
Int. Cl.² B68B *1/00*
U.S. Cl. 54—71 **7 Claims**



1. A leg spreader for spreading forelegs of a quadruped animal having a xiphoid region, to cause the unweighted forelegs of the animal while trotting or pacing, with which it is associated, to move transversely outwardly of the animal to prevent knee knock, said spreader comprising for each foreleg, in combination:

a. anchoring means carried by the animal operatively mounted above the forelegs of the animal,

b. a resilient loop member having an upper end portion adapted to be arranged and disposed outboard and closely adjacent the animal, said loop member being positioned around the upper inside portion of the foreleg, and

c. vertical urging biasing means located within the loop member operatively associated with the end portion of the loop member and the anchoring means to bias the loop member to urge the loop member upwardly to provide leg spreading to prevent knee knock, said loop member having a sufficient size and bulk to cause the unweighted forelegs of said animal to swing over and outwardly of said loop member when moving rearwardly to provide leg spreading and decrease knee knocking.

4,027,463

LAWN MOWER

Katsuhiko Takahashi, Tokorozawa, and Hachiro Doi, Kamifukuoka, both of Japan, assignors to Fuso Keigokin Co., Ltd., Tokyo, Japan

Filed Sept. 4, 1975, Ser. No. 610,222
Claims priority, application Japan, May 30, 1975, 50-65963
Int. Cl.² A01D *55/26*
U.S. Cl. 56—13.6 **6 Claims**

1. A lawn mower comprising:

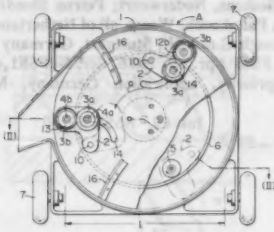
a frame with means to support said frame on the ground,

a motor driven rotary disc supported by and disposed within said frame,

a pair of coacting blades carried by said rotary disc,

frictional means for driving said blades under the influence of centrifugal force, comprising a stationary ring carried by said frame, and a frictional roller mounted upon said disc and being capable of pivotal movement relative to said disc so that when said disc rotates, said frictional roller pivots into contact with said ring under the influence of centrifugal force; and

means operatively connected to said frictional roller for



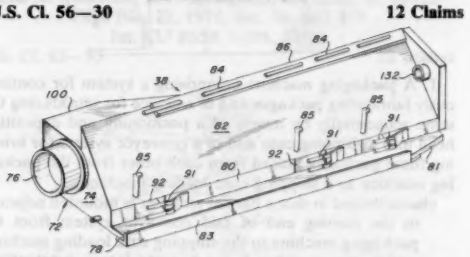
positively rotating both of said blades relative to each other.

4,027,464

COTTON HARVESTING MACHINE

G W (Charles) Stone, Dyess, Ark., assignor to Agriculture Research Incorporated, Williamsburg, Va.

Continuation-in-part of Ser. No. 581,696, May 28, 1975, Pat. No. 3,964,242. This application June 21, 1976, Ser. No. 698,275
Int. Cl.² A01D *46/10*
U.S. Cl. 56—30 **12 Claims**



1. An intake manifold for an apparatus for gleaning cotton comprising:

a floor member,

a frontward end wall and a rearward end wall fixed to opposite ends of the floor member,

an outside wall fixed to an outside edge of the floor member and to the frontward and rearward end walls,

an inside wall having a height significantly less than the outside wall, the inside wall fixed to the floor member parallel to, but some distance from, a running edge of the floor member, the inside wall having a plurality of apertures, each aperture opening into a forwardly- and upwardly-inclined duct,

a downfall sheet fixed to a top edge of the outside wall, the frontward and rearward end walls, and the inside wall so as to be spaced from and inclined with respect to the floor member, the downfall sheet having a plurality of longitudinal slots, each slot being located so as to connect with one of the forwardly-and upwardly-inclined ducts.

4,027,465

ROUND HAY BALER APPARATUS

Vernon J. Lundell, P.O. Box 171, Cherokee, Iowa 51012

Filed July 28, 1975, Ser. No. 599,336
Int. Cl.² A01D *39/00*
U.S. Cl. 56—341 **9 Claims**

1. A baler for picking up cut hay from a field and forming it into a cylindrical bale, said baler comprising:

portable frame means having a forward end and a rearward end;

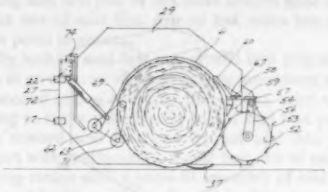
upright spaced sidewalls mounted to said frame;

drum means rotatably mounted within said frame means proximate said rear end, said drum means having pickup

means mounted thereon for picking up the hay and for rolling the hay into a cylindrical bale and for rolling the bale;

spring biased band means mounted above the ground in said frame means and extending from proximate said drum means to proximate said forward end, said band means provided to compact the hay in the bale as it is formed between the ground and said band means;

power means operably connected to said drum means for rotating said drum means; and



said band means includes a cross member extending between said sidewalls above said drum means, a band roller rotatably mounted between said sidewalls proximate said forward end, at least one band having one end secured to said cross member and having the other end wrapped around said roller, spring means interconnected between said sidewalls and said roller to bias said roller in a position wherein said band extends in a first position directly between said roller and said cross member, said band movable from said first position to a second position wherein it forms an arc between said cross member and said roller as it engages the bale being formed thereunder.

4,027,466

PROCESS FOR CONTINUOUSLY TREATING THERMOPLASTIC YARNS

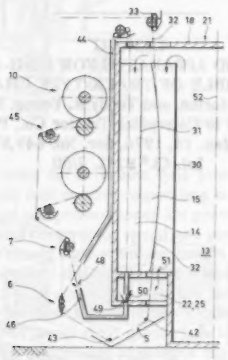
Gustav Brehm, Wattwil, Switzerland, assignor to Heberlein Maschinenfabrik AG, Wattwil, Switzerland

Filed May 25, 1976, Ser. No. 689,919

Claims priority, application Switzerland, June 17, 1975, 7883/75

Int. Cl.² D02J *13/00*; D01H *13/28*

U.S. Cl. 57—34 HS **15 Claims**



1. An installation for continuously treating thermoplastic yarn comprising an assembly of heat-insulated walls defining a substantially closed chamber and including an upper wall formed with an aperture for the passage of yarn therethrough and a lower wall formed with an aperture for the passage of yarn therethrough, a heat treatment unit mounted in said chamber for heating yarn passing into said chamber through one of said apertures, then through said heat treatment unit and out of said chamber through the other of said apertures, means outside said chamber for mechanically deforming the yarn, a winding-up station for yarn outside said chamber, means for feeding heated yarn leaving said chamber through said yarn deforming means to said winding-up station, means for supplying heated air into said chamber, means for withdrawing air out of said chamber so as to cause air to flow through said chamber and means for directing such air over said heating unit to add to the heating effect thereof.

4,027,467

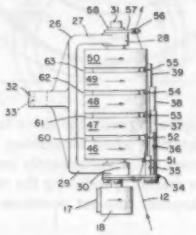
UNIROLL FALSE TWIST DEVICE AND METHOD

Joseph F. Smith, 1901 E. Wendover Ave., Greensboro, N.C. 27405

Filed June 4, 1976, Ser. No. 692,650

Int. Cl.² D02G *1/04*; D01H *7/92*

U.S. Cl. 57—77.4 **12 Claims**



1. A uniroll device for false twisting a continuously traveling yarn comprising; a rotatably bearingly supported driven member for engaging and twisting a continuously traveling yarn, said yarn-engaging and twisting member having a plurality of spaced-apart circular segments, said member having yarn guide means receiving recesses therebetween, yarn guide means including a series of adjustably positioned yarn-engaging spaced-apart members projecting inwardly and spaced from said circular segments in juxtaposition to and cooperatively aligned with said yarn guide receiving recesses and cooperatively supported for engaging and retaining a continuously traveling yarn along a predetermined substantially rectilinear path of contacting travel against said plurality of spaced-apart circular segments and maintaining said traveling yarn outside said recesses whereby a false twist is imparted to the continuously traveling yarn upon rotation of said driven member.

4,027,468

DAY-DATE MECHANISM FOR TRAVEL CLOCK

John T. Felty, Tonica, and Francis J. Ellerbrock, Peru, both of Ill., assignors to General Time Corporation, Mesa, Ariz.

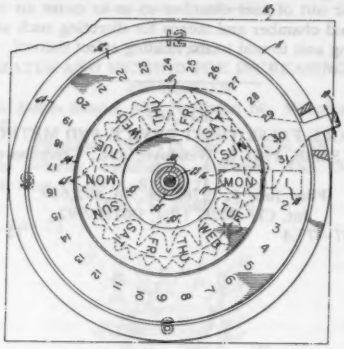
Filed Oct. 31, 1975, Ser. No. 627,595

Int. Cl.² G04B *19/24*

U.S. Cl. 58—4 R **4 Claims**

1. In a clock mechanism having provision for display of day and date, the combination comprising a frame, a drive train having a motor and terminating in minutes and hours shafts, a day ring having "day" indicia and a circle of pointed drive teeth in register therewith, a separate date ring having "date" indicia and a circle of pointed drive teeth in register therewith, the two rings being concentric and of different radius with the indicia thereon progressing the same direction and having a viewing window for display of day and date side by side, a 12-hour wheel coupled to the hours shaft and having a drive pawl thereon, a star wheel having arms in the path of movement of the drive pawl, a detent spring cooperating with the star wheel for causing the same to complete a step of forward indexing when movement is initiated by the drive pawl, an index pawl on the star wheel having arms in a 1:2 ratio with the latter for effecting driving of the index pawl on a 24-hour

cycle, the index pawl being positioned to engage the drive teeth on the rings for moving both of the rings forwardly simultaneously followed by movement of the pawl clear of the drive teeth, detent springs for the respective rings anchored in



the frame and cooperating with the drive teeth to complete a step of forward indexing when movement is initiated by the index pawl, and reset means alternately engageable with the respective rings for manually indexing the rings forwardly step by step with one another into set positions.

4,027,469

DATING MECHANISM FOR CALENDAR CLOCKS

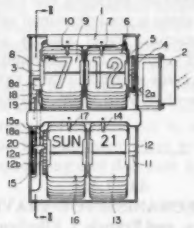
Jusuke Yaguinuma, Koriyami, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed Sept. 30, 1975, Ser. No. 618,240

Claims priority, application Japan, Sept. 30, 1974, 49-118084

Int. Cl.² G04B *19/24, 19/02*

U.S. Cl. 58—6 R **6 Claims**



1. A dating mechanism for leaf-type calendar clocks comprising a body frame, a minute indicating drum and hour indicating drum respectively rotatably adjacently arranged on a first axis mounted on said body frame, a date indicating drum and week day indicating drum respectively rotatably adjacently arranged on a second axis parallel with said first axis, said minute and hour indicating drums being arranged parallelly above said date and week day indicating drums, a first ratchet wheel provided concentrically and integrally with said date indicating drum on one side surface of said date indicating drum, a second ratchet wheel provided concentrically and integrally with said week day indicating drum on one side surface of said week day indicating drum and opposed to said first ratchet wheel, an operating member provided integrally with said hour indicating drum on one side surface of said hour indicating drum, and a feeding lever engageable with said operating member and having a ratchet portion thereon engaging with said first and second ratchet wheels, said date indicating drum and week day indicating drum being intermittently rotated by a predetermined angle through said feeding lever at intervals of one rotation of said hour indicating drum.

4,027,470

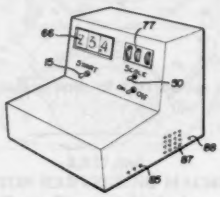
DIGITAL TIMER CIRCUIT

Eliot I. Friedman, 1175 Wendy Road, Ann Arbor, Mich. 48103

Filed Apr. 4, 1975, Ser. No. 565,233

Int. Cl.² G04F *3/02, 8/20;* **G06F** *7/38;* **G01R** *23/02*

U.S. Cl. 58—39.5 **15 Claims**



1. In a method of operating a digital timer on line currents of different frequencies, including half-wave rectifying the line current for converting the line current into square wave pulses, counting timing pulses in counters at a frequency different from the line current frequency by incrementing the counters, and comparing the value in the counters with the desired timing interval to generate an output signal when the values in the counters equals the desired timing interval, and actuating a starting switch to clear the counters, the improvement comprising:

initiating and synchronizing the incrementing of the counters by clearing the counters in response to the next square wave pulse and enabling all successive square pulses thereafter to be converted into timing pulses;

then determining the frequency of the line current by determining the frequency of the square wave pulses;

simultaneously modifying square wave pulses on parallel paths to provide output pulses at different frequencies, one of which equals the timing pulse frequency; and

enabling only output pulses at the timing pulse frequency to increment the counters.

4,027,471

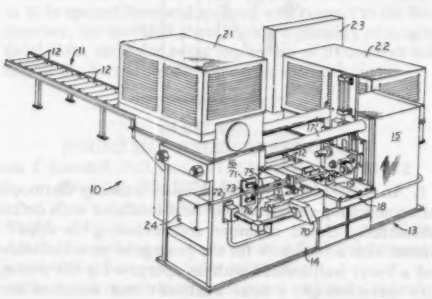
METHOD OF AND APPARATUS FOR SEMI-AUTOMATIC ASSEMBLY OF TRACK-TYPE CHAIN

Charles E. Lipp, Morton, and Teddy R. Young, E. Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 16, 1976, Ser. No. 649,872

Int. Cl.² B21L *9/00*

U.S. Cl. 59—7 **9 Claims**



1. The method of assembling chain comprising a plurality of links each consisting of a pair of spaced interconnected link

sides articulately joined by coacting, concentrically disposed pin and bushing means; said method comprising the steps of:

a. positioning a first one of said pin and bushing means in a given horizontal plane and supporting said pin and bushing means for slidable endwise movement in said plane;

b. supporting a first pair of said link sides on opposite sides of said pin and bushing means in spaced relation thereto but otherwise positioned for interconnection with the bushing thereof in their normal position as assembled into said chain;

c. moving said first pair of link sides toward each other until a first one of said first pair of link sides has reached a given point in space;

d. rigidly locking said first one of said first pair of said link sides at given point in space against movement away from the second one of said first pair of link sides while continuing to move said second one of said first pair of link sides toward said first one thereof and into operative contact with said bushing of said first one of said pin and bushing means until a press-fit assembly of said link sides with said bushing of said pin and bushing means is complete, and

e. indexing said first pair of link sides assembled with said first one of said pin and bushing means in said given plane and perpendicular to the axis of the pin of said first one of said pin and bushing means.

4,027,472

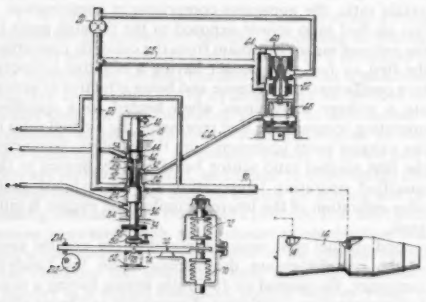
FUEL CONTROL

Charles F. Stearns, East Longmeadow, Mass., assignor to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 559,458, March 18, 1975, Pat. No. 3,975,903. This application Mar. 5, 1976, Ser. No. 664,132

Int. Cl.² F02C 9/08

U.S. Cl. 60—39.28 R **4 Claims**



1. A fuel control for a turbine type power plant having a compressor, said fuel control responding to compressor inlet temperature and compressor speed for providing an acceleration schedule and compressor speed and power lever position for providing a steady state schedule, means responsive to said acceleration schedule and steady state schedule for producing a signal indicative of a ratio of fuel flow to compressor pressure providing an input signal, means producing a signal as a function of actual compressor pressure as an additional input signal, means for multiplying said input signal and said additional input signal, said means including a throttle valve disposed in a cylinder and having a reaction surface and a land adjusting the area of serially connected orifices formed in said cylinder, a pilot valve having a pair of serially connected contoured orifices formed therein, hydraulic means leading pressurized fluid from a pressure source through one of said contoured orifices and through said other contoured orifices and downstream of said throttle valve and a fluid connection interconnecting said reaction surface and said hydraulic means at a point between said pair of serially connected contoured orifices for positioning said throttle valve and means responsive to said additional input means for further positioning said throttle valve.

4,027,473

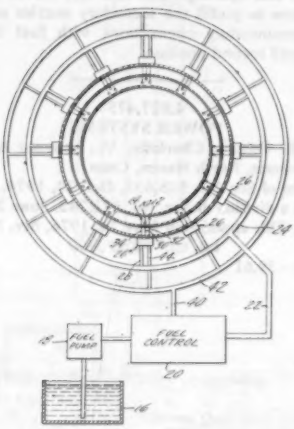
FUEL DISTRIBUTION VALVE

Joseph R. Baker, Vernon, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Mar. 5, 1976, Ser. No. 664,130

Int. Cl.² F02C 9/08

U.S. Cl. 60—39.28 R **10 Claims**



1. A distribution system for a primary and secondary fuel nozzle system for a combustor of a turbine type power plant comprising at least one distributor valve having a first movable means for exposing a fuel opening in said first movable means communicating with said primary nozzle in a first and second position thereof and another fuel opening in said first movable means communicating with said secondary nozzle solely in the said second position thereof, a second movable means movable relative to said first movable means for regulating flow of fuel through both of said fuel openings, and means responsive to the pressure drop across at least one of said openings for regulating the position of said second movable means, whereby the flow through each of said openings bears a given relationship to each other for each pressure drop value.

4,027,474

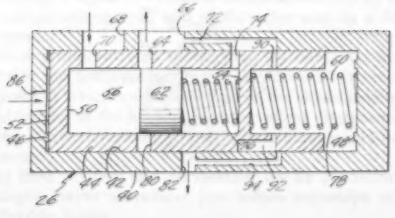
FUEL PREFILL AND DISTRIBUTOR VALVE CONSTRUCTION

John P. Demase, Colchester, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Mar. 5, 1976, Ser. No. 664,131

Int. Cl.² F02C 9/08

U.S. Cl. 60—39.28 R **13 Claims**



1. A distribution system for a primary and secondary fuel

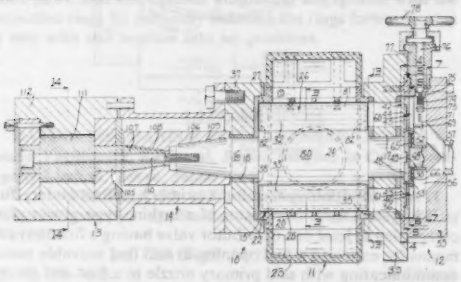
nozzle system for a combustor of a turbine type power plant comprising at least one distributor valve having a first movable means for exposing a fuel opening in said first movable means communicating with said primary nozzle in a first and second position thereof and another fuel opening in said first movable means communicating with said secondary nozzle solely in the said second position thereof, a second movable means movable relative to said first movable means for regulating flow of fuel through both of said fuel openings, said second movable means having means for proportioning the flow through said fuel openings being responsive to the pressure drop across at least one of said openings, and said first movable means including means to prefill the secondary nozzles and its associated communicating connections with fuel immediately preceding said second position.

4,027,475

POWER SYSTEMS

Lawrence R. Folsom, Charlotte, Vt., assignor to Advanced Power Systems, North Haven, Conn.

Continuation of Ser. No. 518,633, Oct. 29, 1974, abandoned, which is a division of Ser. No. 371,742, June 20, 1973, abandoned. This application May 24, 1976, Ser. No. 689,460
Int. Cl.² F02G *3/00*
U.S. Cl. 60—39.61 **26 Claims**



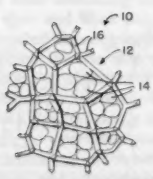
1. A drive system comprising an engine of the type having a housing, a rotor reversely rotatable between two extremities in said housing where the rotor has at least one radial vane extending into at least one chamber defined by said extremities, means for varying the magnitude of the angular strokes and the speed of said rotor, and an energy conversion device coupled to said rotor to convert the oscillatory mechanical energy of said rotor to unidirectional energy of another form.

4,027,476

COMPOSITE CATALYST BED AND METHOD FOR MAKING THE SAME

Eckart W. Schmidt, Bellevue, Wash., assignor to Rocket Research Corporation, Redmond, Wash.

Continuation of Ser. No. 406,700, Oct. 15, 1973, abandoned. This application Oct. 15, 1975, Ser. No. 622,607
Int. Cl.² C06D *5/04;* **B01J** *8/00, 35/04*
U.S. Cl. 60—218 **46 Claims**



1. A composite catalyst bed comprising:

a. a three dimensional, structurally rigid foam metal matrix, comprising a network of interconnected ligaments which define a plurality of interconnected pores, and

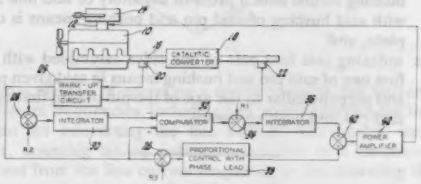
b. a plurality of separate pellet-like catalyst carrying particles, each comprising a supporting carrier material that carries a catalyst material, and positioned in and filling the pores of such matrix, with relative movement of said particles being restrained by said matrix.

4,027,477

DUAL SENSOR CLOSED LOOP FUEL CONTROL SYSTEM HAVING SIGNAL TRANSFER BETWEEN SENSORS DURING WARMUP

Edwin C. Storey, Rochester, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 29, 1976, Ser. No. 681,533
Int. Cl.² F02B *3/00*
U.S. Cl. 60—276 **2 Claims**



1. For use with an internal combustion engine including means effective to supply air and fuel thereto in variable ratio and exhaust means including a catalytic converter effective, when supplied with exhaust gases containing air and fuel in a certain ratio, to accelerate simultaneously the oxidation of unburned fuel and the reduction of nitrogen oxides, apparatus for controlling the ratio of air and fuel in the exhaust system to the certain ratio, the apparatus comprising in combination:

a first air-fuel ratio sensor exposed to the exhaust gases in the exhaust means upstream from the catalytic converter, the first air-fuel ratio sensor having a negative temperature coefficient of resistance and being effective to generate a voltage thereacross when heated to a specified operating temperature that represents the air-fuel ratio in the exhaust gases upstream from the catalytic converter, the first air-fuel ratio sensor being quickly heated to the specified operating temperature by the exhaust gases after operation of the internal combustion engine is initiated;

a second air-fuel ratio sensor exposed to the exhaust gases in the exhaust means downstream from the catalytic converter, the second air-fuel ratio sensor having a negative temperature coefficient of resistance and being effective to generate a voltage thereacross when heated to the specified operating temperature that represents the air-fuel ratio of exhaust gases downstream from the catalytic converter, the second air-fuel ratio sensor being heated to the specified operating temperature by the exhaust gases after operation of the internal combustion engine is initiated a catalytic converter imposed time delay after the first air-fuel ratio sensor is heated to the specified operating temperature;

a resistor having a resistance much less than the impedance of the second air-fuel ratio sensor prior to initiation of operation of the internal combustion engine and subsequent heating of the second air-fuel ratio sensor;

means effective to couple the voltage generated by the first air-fuel ratio sensor across the series combination of the second air-fuel ratio sensor and the resistor, the voltage across the second air-fuel ratio sensor being influenced by the voltage generated by the first air-fuel ratio sensor in decreasing relationship with increasing temperature of the second air-fuel ratio sensor; and

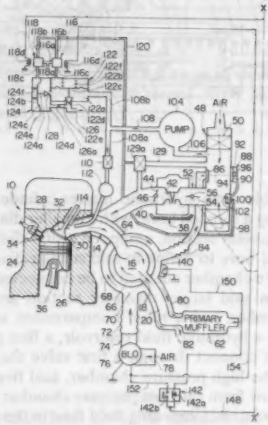
means responsive to the voltage across the first and second

air-fuel ratio sensors effective to continually adjust the fuel and air supply means to vary the ratio of fuel and air supplied to the engine in a sense to reduce the deviation of the ratio of fuel and air in the exhaust means from the certain ratio.

4,027,478
MULTIPLE-CYLINDER INTERNAL COMBUSTION ENGINE

Kenji Masaki, Yokohama, and Naomi Tokura, Yokosuka, both of Japan, assignors to Nissan Motor Co., Ltd., Japan

Filed Oct. 1, 1975, Ser. No. 618,406
Claims priority, application Japan, Oct. 3, 1974, 49-114175
Int. Cl.² F01N *3/10;* **F02B** *75/10*
U.S. Cl. 60—285 **13 Claims**

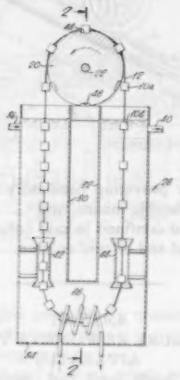


1. A spark-ignition multiple-cylinder internal combustion engine for an automotive vehicle, comprising in combination first and second sets of cylinders, a mixture induction system for supplying an air-fuel mixture richer than a stoichiometric mixture to said first set of cylinders and an air-fuel mixture leaner than the stoichiometric mixture to said second set of cylinders, an air-intake system for supplying air to said mixture induction system, an exhaust system to which said cylinders are jointly connected, an exhaust re-combustion chamber incorporated into said exhaust system for mixing and re-combusting exhaust gases from said cylinders, first heat-exchange means associated with said exhaust re-combustion chamber and responsive to the temperature of the exhaust re-combustion chamber for absorbing heat from the re-combustion chamber in a heated condition, second heat-exchange means associated with said air-intake system and responsive to medium to low load operating conditions of the engine for warming up air in the air-intake system during the medium to low load operating conditions, secondary-air supply means responsive to the temperature of said exhaust re-combustion chamber and to cold driving condition of the engine for supplying secondary air to the exhaust gases entering the exhaust re-combustion chamber at a rate varying with engine load during the medium to low load operating conditions and peaking up during the cold driving condition, a spark ignition system responsive to the cold driving condition of the engine for retarding the ignition timings of at least said first set of cylinders, said first heat-exchange means including an air jacket having a portion enclosing said exhaust re-combustion chamber and having a first air outlet port directly open to the atmosphere and a second air outlet port communicating with said second heat-exchange means, an electrically-operated positive-displacement air-feed unit for feeding air into said air jacket when energized, and an electric control circuit responsive to the temperature of said exhaust re-combustion chamber and operative to energize said air-feed unit when the temperature of the exhaust re-combustion chamber rises to a predetermined level.

4,027,479
VARIABLE DENSITY HEAT ENGINE

John S. Cory, 1436 View Point, Escondido, Calif. 92025

Filed May 6, 1976, Ser. No. 684,066
Int. Cl.² F03G *7/06*
U.S. Cl. 60—527 **38 Claims**



14. A thermal energy converter comprising,
an endless loop including,
a plurality of reactive elements that tend to move in a force field,
a shape memory material having different low and high temperature configurations, and
means for interconnecting said elements and material to position said elements in a first density when said material is in said low temperature configuration and in a second density when said material is in said high temperature configuration,
a force field,
means for guiding said loop along a closed path having a first section in said force field,
means for causing said loop to have an increased temperature in said path section whereby said elements are in said second density as the loop traverses said path section, and means for cooling and deforming said material in sections of said path following said first section.

4,027,480
HYDRAULIC ENGINE

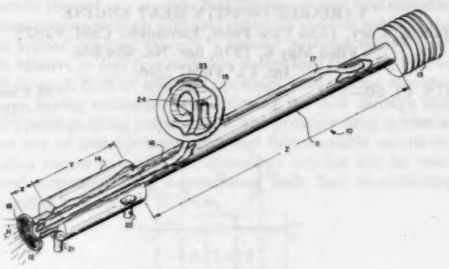
William A. Rhodes, 4421 N. 13th Place, Phoenix, Ariz. 85014

Filed Dec. 29, 1975, Ser. No. 644,542
Int. Cl.² F01K *25/10;* **F03G** *7/02*
U.S. Cl. 60—531 **15 Claims**

1. A method of absorbing thermal energy and transforming it into an oscillating mechanical function comprising the steps of:
confining a liquid in a column closed at one end by a thermal absorbing head and at the other end by a flexible means,
directing concentrated thermal energy onto said head to raise the temperature in the column until it reaches a point at which nucleate boiling of the liquid begins,
said boiling of the liquid causing a violent displacement of liquid transferred to its fluid stage to actuate said flexible means,
said fluid cooling and condensing on its expansion and displacement movement just before expansion of said flexible means,
said contracting effect combined with the reactive forces of

the flexible means connected to a load drives the spent condensed fluid back toward said head,

the returning fluid condensed to liquid encountering a new cycle of nucleate boiling liquid which initiates an ensuing



cycle, thereby providing oscillatory mechanical movement of said flexible means, and

cooling the liquid confined in said column at said thermal absorbing head end of said column.

4,027,481

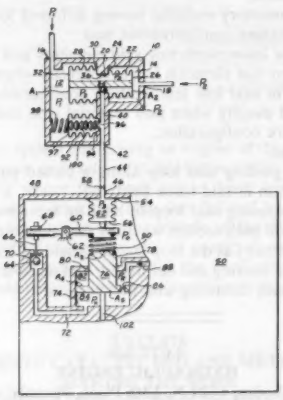
FLUID PRESSURE RESPONSIVE TRANSDUCER APPARATUS

Paulmer D. Hunt, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.

Filed Dec. 11, 1975, Ser. No. 639,946

Int. Cl.² F15B 7/00

U.S. Cl. 60—533 **10 Claims**



1. Fluid pressure responsive transducer apparatus comprising:

a first input bellows exteriorly exposed and responsive to a first pressurized fluid and having a first predetermined internal volume;

a second input bellows exteriorly exposed and responsive to a second pressurized fluid and having a second predetermined internal volume;

an output bellows vented interiorly to the interior of said first and second bellows and together therewith defining a sealed volume of fluid;

a strut member fixedly secured at opposite ends to movable ends of said first and second bellows for maintaining the same in fixed spaced apart relationship;

said first and second predetermined internal volumes being of different capacity and simultaneously variable in response to pressure variations of at least one of said first and second pressurized fluids to thereby internally pressurize said output bellows as a predetermined function of said first and second pressurized fluids.

4,027,482

VARIABLE RATIO HYDRAULIC MASTER-CYLINDER

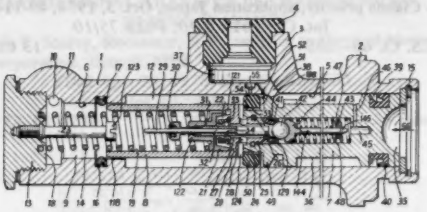
Ferruccio Manzini, Crema (CR), Italy, assignor to Abred Establishment, Italy

Filed May 27, 1975, Ser. No. 581,242

Claims priority, application Italy, June 17, 1974, 68887/74

Int. Cl.² F15B 7/04

U.S. Cl. 60—574 **9 Claims**



1. A variable ratio hydraulic master-cylinder including a housing having a stepped bore, with a smaller diameter section and larger diameter section, a stepped piston slidably mounted in the stepped bore to define in said smaller diameter section a high pressure chamber adapted to be connected to a utilizing circuit and in said larger diameter section an annular low pressure chamber and a relief compartment adapted to be connected to a hydraulic fluid reservoir, a first passage in the said piston to connect through a first valve the low pressure chamber to the high pressure chamber, said first valve allowing fluid to flow from said low pressure chamber into said high pressure chamber but impeding fluid flow in the reverse direction, a second passage in the said piston to connect through a spring-biased second valve the low pressure chamber to the relief compartment, said second valve being moved in its opened position when the differential of pressures between the low pressure chamber and the relief compartment is above a predetermined level, characterized in further including a third valve for interrupting fluid flow from said low pressure chamber into said reservoir and control means for operating said third valve into its closed position when the stroke of the stepped piston from its rest position is increased above a predetermined length due to an insufficiency of hydraulic fluid in said high pressure chamber to pressurize said utilizing circuit, said third valve means remaining in its closed position when the stepped piston moves through a stroke less than the predetermined length, but sufficient to generate a pressure level capable of actuating the vehicle brakes.

4,027,483

DEVICE FOR CONVERTING INTERNAL ENERGY OF HOT FLUIDS TO SHAFT WORK

Edward F. Wahl, III, Claremont, Calif., assignor to Occidental Petroleum Corporation, Los Angeles, Calif.

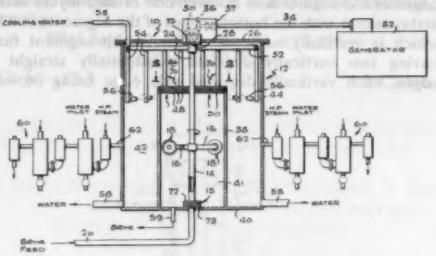
Filed Aug. 18, 1975, Ser. No. 605,289

Int. Cl.³ F03G 7/00; F01K 25/00; F01D 1/18

U.S. Cl. 60—641 **47 Claims**

1. A device for converting the internal energy of hot fluids to mechanical work, which comprises a container, hollow rotatable shaft means mounted within said container, conduit means communicating with one end of said shaft means for feeding a hot liquid into said hollow shaft means, means connecting said conduit means and said one end of said shaft means, fluid expansion means mounted on said rotatable shaft means and capable of rotating said shaft means, means for feeding hot liquid from said hollow shaft means to said fluid expansion means, passage of said hot liquid through said expansion means and discharge therefrom being capable of

delivering a rotary thrust to said hollow shaft means and causing rotation thereof, transmitting means for transmitting the work generated by said rotatable shaft means to a machine,



said transmitting means connected to said shaft means, and means for removing fluid discharged from said expansion means, from said container.

4,027,484

MODULAR ENGINE ASSEMBLY

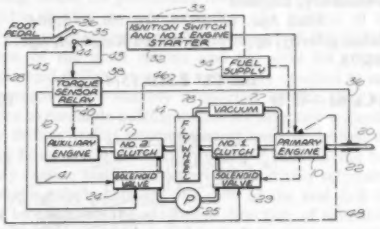
Marvin E. Wallis, 5535 Longfellow Road, Santa Barbara, Calif. 93111

Continuation of Ser. No. 557,746, March 12, 1975, Pat. No. 3,949,556. This application Jan. 19, 1976, Ser. No. 650,374

The portion of the term of this patent subsequent to Apr. 13, 1993, has been disclaimed.

Int. Cl.² F01B *21/00*

U.S. Cl. 60—709 **12 Claims**



1. A modular engine assembly for connection with a transmission driven thereby comprising:

a primary engine,

means for starting said primary engine,

means for connecting said primary engine to the transmission for driving the latter by said primary engine,

an auxiliary engine,

means for selectively coupling and decoupling said auxiliary engine and said primary engine one to the other for driving the transmission selectively by said primary engine or both said primary engine and said auxiliary engine,

and means for starting said auxiliary engine including means for storing kinetic energy developed by said primary engine and applying said kinetic energy to said auxiliary engine to assist in starting said auxiliary engine.

4,027,485

MODULAR ENGINE ASSEMBLY

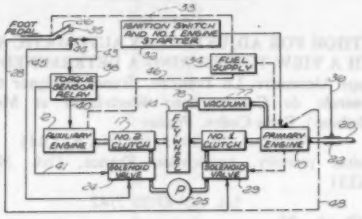
Marvin E. Wallis, 5535 Longfellow Road, Santa Barbara, Calif. 93111

Continuation-in-part of Ser. No. 557,746, March 12, 1975, Pat. No. 3,949,556. This application Jan. 26, 1976, Ser. No. 652,326

The portion of the term of this patent subsequent to Apr. 13, 1993, has been disclaimed.

Int. Cl.² F01B *21/00*

U.S. Cl. 60—709 **46 Claims**



1. A modular engine assembly for connection with a transmission driven thereby comprising:

a primary rotary engine,

means for starting said primary rotary engine,

means for connecting said primary engine to the transmission for driving the latter by said primary engine,

an auxiliary rotary engine,

means for selectively coupling and decoupling said auxiliary rotary engine and said primary rotary engine one to the other for driving the transmission selectively by said primary engine or both said primary engine and said auxiliary engine, and

means for starting said auxiliary engine including means for storing kinetic energy developed by said primary engine and applying said kinetic energy to said auxiliary engine to assist in starting said auxiliary engine.

4,027,486

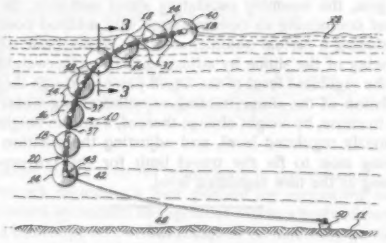
ADJUSTABLY SUBMERSIBLE BREAKWATER

Earle T. Dougherty, 3420 N. 71st Ave., Phoenix, Ariz. 85033

Filed Mar. 2, 1976, Ser. No. 663,097

Int. Cl.² E02B *3/06*

U.S. Cl. 61—5 **6 Claims**



1. An adjustably submersible breakwater assembly comprising:

a. at least a pair of elongated hermetically sealed hollow tanks disposed in substantially parallel relationship with respect to each other and having their ends in substantial alignment;

b. each of said tanks having a pair of spool members each of which is axially affixed to a different one of the opposite ends of said tank;

c. interconnection means extending between the aligned ends of said tanks and coupled to the ones of said spool members mounted thereon for interconnection of said pair of tanks, said interconnection means pivotably connected to said spool members to allow said tanks to freely rotate about their respective axes and freely swing relative to each other;

d. means on each of said tanks for individual adjustment of the buoyancy thereof; and

e. means connected to at least one of said tanks for anchoring thereof.

4,027,487

METHOD FOR ADJUSTING AN AUTOMATIC SLUICE WITH A VIEW TO ENSURING A DETERMINED LEVEL

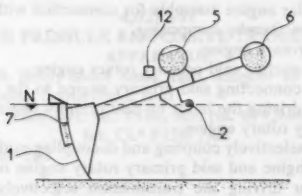
Philippe Alexandre, La Tronche, France, assignor to Societe Generale de Constructions Electriques et Mecaniques (Alsthom), Paris Cedex, France

Filed Oct. 30, 1975, Ser. No. 627,041

Claims priority, application France, Oct. 30, 1974, 74.36231

Int. Cl.² E02B *7/42*

U.S. Cl. 61—25 **3 Claims**



1. A method for adjusting an automatic sluice so that it ensures a constant upstream level of a liquid at a determined level mark above or below an axis of rotation of the sluice, the sluice being constituted by a frame pivotably mounted on said axis of rotation and including a sector-shaped gate positioned on said frame on one side of said axis of rotation and centered on said axis of rotation, a hollow sector-shaped float centered on the same axis of rotation and protruding at the upstream face of the said gate, and first and second regulable counterweights integral with the frame, the first counterweight being vertically disposed with respect to said axis in one position of said gate and remaining on one side of said axis in travel of the gate to the other position, the second counterweight being disposed on the frame on the opposite side of the axis from said gate, the assembly oscillating about said axis, the sluice further comprising an opening stop, said method comprising introducing a certain quantity of water in the float, effecting balancing of the sluice by adjusting the counterweights such that the regulated level of the liquid passes through the axis of oscillation of the sluice, adding or withdrawing water in the float to cause, by weight change thereof, a shift in height of the previously regulated level, and adjusting the position of the opening stop to fix the travel limit for the corresponding opening at the new regulated level.

4,027,488

SHAFT LINER ASSEMBLY

Radovan Preradovich, 191 Cadillac Avenue, Val d'Or, Quebec, Canada

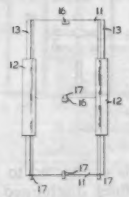
Filed Feb. 4, 1975, Ser. No. 547,094

Claims priority, application Canada, Feb. 8, 1974, 192105

Int. Cl.² E21D *5/06*

U.S. Cl. 61—41 R **2 Claims**

1. A shaft liner assembly for a manhole adapted for easy assembly and disassembly on site in the ground for retaining when assembled the ground thereabout, said assembly comprising a plurality of vertically adjacent layers of arcuate segments, said segments in each layer forming a circle, each segment having two horizontally disposed arcuate edge portions, one edge portion defining the top edge of said segment and the other defining the bottom edge thereof with the top edges of the segments in a lower one of said layers being in juxtaposition with the bottom edges of the segments in a layer which is vertically adjacent thereto, each segment further having two vertically disposed substantially straight side edges, each vertically disposed side edge being outwardly



reversely bent, and a series of connecting brackets, each bracket having a longitudinally extending base portion with wing portions extending from opposite sides thereof and inclined toward one another, each bracket being in vertical sliding engagement with adjacent reversely bent portions of respective laterally adjacent segments in two vertically adjacent layers of segments, the wing portions of each connecting bracket being on the opposite side of the respective reversely bent portions of the segments to the base portion to secure both laterally and vertically adjacent segments together.

4,027,489

MINE ROOF SUPPORT

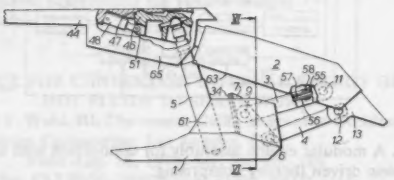
John Hirst Walker, Winchcombe; James Anthony Sutton, Stoke Orchard, and John Henry Waters, Up Hatherley, all of England, assignors to Dowty Mining Equipment Limited, Tewkesbury, England

Filed Apr. 12, 1976, Ser. No. 675,804

Claims priority, application United Kingdom, Apr. 17, 1975, 15798/75

Int. Cl.² E21D *15/44*

U.S. Cl. 61—45 D **10 Claims**

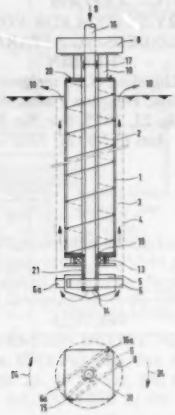


1. A mine roof support comprising a floor engaging means, a roof engageable means above the floor engaging means, and interconnection between the floor engaging means and the roof engageable means, the interconnection including two shields in side-by-side relationship, a part of each shield being pivotally associated at the roof engageable means and being capable of movement in a heightwise direction relative to the corresponding part of the other shield, spring means for urging the shields into their side-by-side relation in which the said shield parts have the same height setting, and jack means adjustable in length to vary the height of the roof engageable means over the floor engaging means.

4,027,490
SELF-SINKING, AXIAL PASSAGE FOUNDATION PILE AND METHOD

Heinrich Stade, Heide, Holstein, and Klaus David, Kiel, both of Germany, assignors to Heinrich Stade, Heide, Holstein, Germany

Filed Sept. 10, 1975, Ser. No. 612,196
Int. Cl.² E02D 7/28
U.S. Cl. 61—53.5 9 Claims



1. A self-sinking pre-fabricated concrete foundation pile assembly comprising:

a. a generally elongate rigid steel reinforced concrete pile having a centrally disposed axial bore opening on first and second ends of the pile;

b. rotatable shaft means rotatably disposed within the axial bore and extending from both the first and second ends of the pile for transmission of rotational torque through the pile, wherein said shaft means are removable from said axial bore;

c. drill bit means coupled to the portion of the shaft means extending from the second end of the pile for drilling a sinking hole for the pile;

d. securing means for preventing rotation of the pile; and

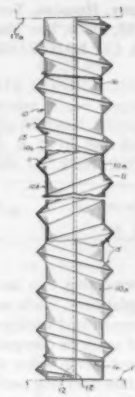
e. rotatable driving means coupled to the portion of the shaft means extending from the first end of the pile for rotation of the shaft means and the drill bit means, wherein said drill bit means is releasably coupled to said shaft means and rotatably supported by the pile and includes expandable cutting means for selective widening of the drilling radius beyond that utilized in drilling the sinking hole, said expandable cutting means having two primary cutting blades which are alternatively selectable by reversing the rotational direction of the said drill bit means by changing the rotational direction of said shaft means and wherein said rotatable shaft means is generally hollow and capable of transmitting liquids and wet concrete from said first end to said second end of said pile.

4,027,491
COMPOSITE EARTH DRILLING AUGER AND METHOD OF INSTALLING SAME IN SITU

Lee A. Turzillo, 2078 Glengary Road, Akron, Ohio 44313

Continuation of Ser. No. 441,079, Feb. 11, 1974, abandoned.
This application Jan. 27, 1975, Ser. No. 544,402
Int. Cl.² E02D 5/30, 5/32
U.S. Cl. 61—53.56 26 Claims

1. A device for producing a pile in an earth situs comprising; an elongated tubular shell of self-supportingly rigid material, formed with outwardly protruding hollow spiral flighting along the same; said shell, including said hollow flighting, being adapted to be filled with solid load-supporting material, whereby the filled tubular shell can be drilled into an earth situs and retained therein as a solid load supporting pile, said formed tubular shell including complementally connecting

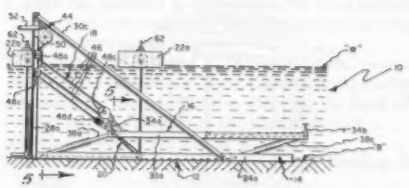


half shell parts adapted to be produced in quantity for nesting like half shell parts compactly stacked one within another for subsequent assembly and use for producing piles.

4,027,492
TRANSPORTABLE BOAT LIFT

Charles R. Carpenter, Jamestown, N.Y., assignor to Metallic Ladder Manufacturing Corporation, Randolph, N.Y.

Filed June 10, 1976, Ser. No. 694,557
Int. Cl.² B63C 1/02
U.S. Cl. 61—65 9 Claims



1. A transportable boat lift comprising in combination:

a framework including a base portion for supporting said framework by bottom engagement within a body of water and a boat support portion mounted on said base portion for vertical movement relative thereto between boat supporting and non-supporting positions;

operator control means for controlling movement of said boat support portion between said positions;

flotation means; and

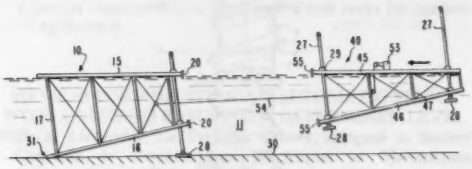
means for movably attaching said flotation means to said base and boat support portions for lowering and raising said framework to removably position said base portion for bottom engagement within said body of water incident to vertical movements of said boat support portion between said positions.

4,027,493

METHOD AND APPARATUS FOR CONNECTING TWO OR MORE COMPONENTS OF AN OFFSHORE PLATFORM

Arthur L. Guy, Jr., Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Apr. 15, 1976, Ser. No. 677,345
Int. Cl.² E02D *21/00*
U.S. Cl. 61—96 **18 Claims**



1. A method for connecting two sections of an offshore jacket of an offshore platform, each section having at least three legs, each leg of one of said sections having a companion leg on the other of said sections comprising:

floating one of said sections in water with sufficient positive buoyancy to maintain said one section with at least one leg at or above the water's surface and the remaining leg or legs submerged to a selected shore site;

grounding said submerged leg or legs of said one section and making said one section negatively buoyant at said selected shore site;

floating said other section in said water with sufficient positive buoyancy to maintain said other section with at least one leg at or above the water's surface and the remaining leg or legs submerged to said selected shore site; and

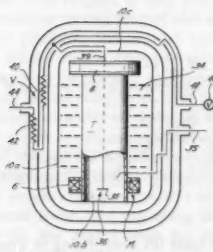
joining the companion legs of said sections to unitize said jacket.

4,027,494

LOW GRAVITY PHASE SEPARATOR

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of George F. Smoot, Berkeley; William L. Pope, Walnut Creek, and Lawrence Smith, Santa Clara, all of Calif.

Filed Sept. 12, 1975, Ser. No. 612,966
Int. Cl.² F17C *7/02*
U.S. Cl. 62—50 **2 Claims**



1. In a superconducting magnetic spectrometer adpated for operation in a low gravity or zero gravity space environment for measuring cosmic rays and like effects, an apparatus for separating the gas and liquid phases of a diamagnetic cryogen under low gravity conditions to reduce venting of the liquid phase of the cryogen, said apparatus comprising:

a. cryostat means for containing the cryogen,

b. vent means for venting the gaseous phase of the cryogen from said cryostat means; and

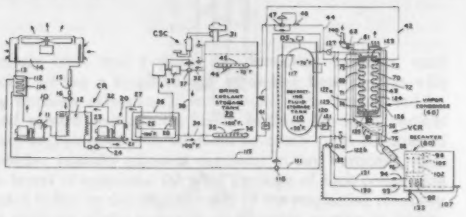
c. magnet means mounted in said cryostat means adjacent said vent means for repelling the liquid phase of the diamagnetic cryogen from said vent means to reduce venting of the liquid phase of the cryogen, said magnet means comprising a first superconducting toroidal coil disposed adjacent the spectrometer for providing a deflecting magnetic field in the spectrometer and a second superconducting coil disposed remote from said spectrometer in substantially coaxial relation with said first coil and providing an opposing magnetic field to that of said first coil.

4,027,495

VAPOR RECOVERY SYSTEM FOR VOLATILE LIQUIDS AND VAPOR CONDENSING APPARATUS FOR USE THEREIN

Ray C. Edwards, Kinnelon, N.J., assignor to Edwards Engineering Corporation, Pompton Plains, N.J.

Filed July 22, 1975, Ser. No. 598,004
Int. Cl.² F17C *7/02*
U.S. Cl. 62—54 **17 Claims**



1. In a Vapor Recovery System;

a. a refrigerant cooling means,

b. a storage tank having a cooling medium therein operatively connected to said refrigerant cooling means to maintain said cooling medium at a predetermined reduced temperature, and means for circulating said cooling medium to and from said storage tank,

c. at least one vapor condenser means having, a plurality of finned type cooling coils, said finned typed cooling coils having an inlet connected to said means for circulating said cooling medium to permit cooling medium to be passed to said finned type cooling coils, and an outlet on said finned type cooling coils connected to said circulating means for returning said cooling medium to said storage tank,

d. each vapor condenser having, an inlet means connected to a source of vapor to be condensed, and an outlet port for air, non-condensable gases and uncondensed vapors from said source, and a discharge outlet for the condensate mixture having condensed vapors therein.

e. the finned type cooling coils in each vapor condenser having means to prevent ice forming thereon to block the flow of vapor across said finned type cooling coils,

f. a decanter for separating the liquid components of said condensate, and

g. means connecting the decanter to the discharge outlet for condensate on said vapor condensing means.

4,027,496

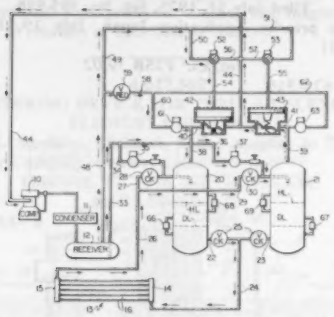
DUAL LIQUID DELIVERY AND SEPARATION APPARATUS AND PROCESS

Milton W. Garland, Waynesboro, Pa., assignor to Frick Company, Waynesboro, Pa.

Filed June 22, 1976, Ser. No. 698,641
Int. Cl.² F25B *5/00, 41/00, 39/02*
U.S. Cl. 62—117 **9 Claims**

1. In a refrigeration system having a compressor, condenser, receiver and evaporator, the improvement comprising a pair of pumping tank means, said tank means alternately receiving refrigerant liquid and vapor from said evaporator at evaporator pressure, means for discharging refrigerant vapor from said tank means to said compressor, means for alternately

pressurizing said tank means for discharging refrigerant liquid at evaporator temperature from said tanks to said evaporator, said pressurizing means receiving vapor under condenser



pressure from said receiver, and means for reducing the pressure of the pressurizing vapor to a level less than condenser pressure but greater than evaporator pressure.

4,027,497

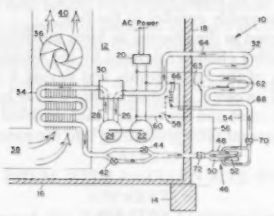
FREEZE-UP PREVENTION DEVICE FOR A HEAT PUMP

Merrell E. Thurman, 6301 Fox Run, San Antonio, Tex. 78233

Filed Feb. 26, 1976, Ser. No. 661,728

Int. Cl.² F25D *21/06*

U.S. Cl. 62—156 **9 Claims**



1. A heat pump system for alternately heating and cooling a given space, said system comprising:

a source of power;

a compressor driven by the source of power, said compressor having an inlet and outlet;

valve means connecting to said inlet and outlet;

inside coil located within said given space;

outside coil located outside said given space; said valve means connecting said inlet to said inside coil and said outlet to said outside coil for cooling, and alternatively connecting said inlet to said outside coil and said outlet to said inside coil for heating, said inside and outside coils being adapted to receive a refrigerant from said compressor;

expansion valve means connected to said inside coil for allowing said refrigerant to flow therethrough, said refrigerant being at a high pressure liquid state on one side of said expansion valve means and at a low pressure liquid state after flowing through said expansion means;

sensing means for sensing freeze-up conditions on said outside coil;

freeze-up prevention means disposed between said expansion valve means and said outside coil for receiving said refrigerant therethrough, said freeze-up prevention being responsive to said sensing means upon sensing said freeze-up conditions to connect a heating element to said source of power for adding heat to said refrigerant if ice begins to accumulate on said outside coil during heating of said given space, said heating element being generally pie-shaped and sandwiched between parallel, generally pie-shaped conduit means from said expansion valve means for maximum heat transfer thereto.

4,027,498

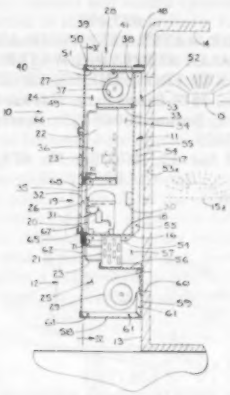
AIR CONDITIONER

Herman Sylvester Fessler, Coon Rapids, Minn., assignor to McLean Engineering Midwest, Maple Grove, Minn.

Filed Apr. 2, 1976, Ser. No. 673,068

Int. Cl.² F25D *23/12*

U.S. Cl. 62—263 **25 Claims**



1. An air conditioner for attachment to the exterior wall of an enclosure box for controlling the temperature within the enclosure box, comprising:

a. an outer cabinet wrap having

1. A pair of side panels attached to a pair of end panels and forming a rectangular shaped wrap having an open front and back, there being a peripheral edge around the back having means for mounting of the air conditioner to the wall of an enclosure box,
2. a first fan mounted to the inside of the wrap adjacent to a first one of the ends, the fan being ducted for exhausting air from within the wrap, and
3. a second fan mounted to the inside of the wrap adjacent to the second end, the second fan being ducted for blowing air from within the wrap out the back of the wrap and into an inlet in the enclosure wall;

b. a refrigeration chassis having

1. a frame having first and second legs forming an L-shape,
2. an operable refrigeration system mounted on the frame with a compressor and a condenser coil mounted on a first side of the L-shaped frame and an evaporator coil mounted on a second side of the L-shaped frame,
3. the chassis being mounted in the wrap with a first leg of the L-shaped frame being adjacent and parallel to the back and the second leg extending between the wrap front and the back, the frame being attached to each side of the wrap and dviding the wrap into first and second chambers with the compressor, condenser coil and first fan being in the first chamber and the evaporator coil and second fan being in the second chamber;

c. a baffle positioned between the evaporator coil and the wrap back and baffling the second chamber into an air inlet from the wrap back to the evaporator coil and into an air outlet from the evaporator coil to the second fan;

d. an air inlet to the first chamber; and

e. a cabinet front cover removably fastened to the wrap and forming in the first chamber a path of air flow from the inlet through the condenser coil and then to the first fan, and also closing the front of the second chamber.

4,027,499

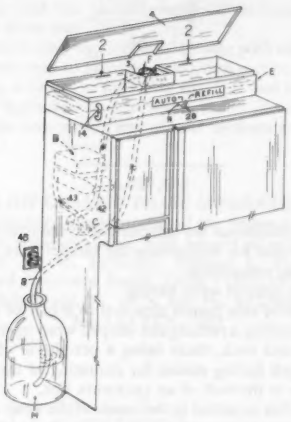
REFRIGERATOR WATER RESERVOIR ASSEMBLY FOR AUTOMATICALLY SUPPLYING WATER TO THE ICE MAKER FROM THE RESERVOIR

Robert W. Barto, 2019 Duval Lane, Hayward, Calif. 94545, and Leonard A. Brown, 20045 Elfin Forrest Road, Escondido, Calif. 92025

Filed Apr. 12, 1976, Ser. No. 675,919

Int. Cl.² F25C *1/00*

U.S. Cl. 62—340 **3 Claims**



1. A refrigerator having an automatic ice maker unit with a first water conveying conduit communicating with said unit and having a solenoid valve for controlling the water flow through said conduit;

a. a water reservoir containing water; b. a motor driven pump that has a water inlet communicating with the water in said reservoir, said pump having a water outlet second conduit communicating with said solenoid valve; and

c. said automatic ice maker having means for closing an electric circuit when the ice maker requires a supply of water, this electric circuit connecting the motor of said pump to a source of electricity for starting the motor and for opening said solenoid valve;

d. whereby when said automatic ice maker needs water and causes said means to close the electric circuit to start the motor for the pump and open said solenoid valve for feeding water under pressure from said reservoir through said pump and said water outlet second conduit through said valve and said first water conveying conduit to said automatic ice maker, the water flow continuing until said automatic ice maker unit completes its cycle and said means opens the electric circuit to the motor and will stop both the motor and the pump.

4,027,500

AUTOMOBILE AIR CONDITIONER EVAPORATOR

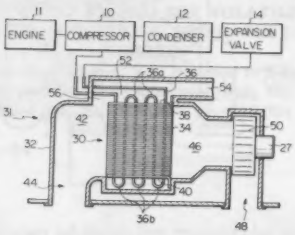
Kazuo Utsugi, Kawagoe, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed July 14, 1975, Ser. No. 595,988

Claims priority, application Japan, July 19, 1974, 49-85795[U]

Int. Cl.² F25B *39/02*

U.S. Cl. 62—519 **5 Claims**



1. An air conditioner evaporator comprising:

a fin assembly having a plurality of parallel fins;

a refrigerant tube which is doubled back on itself a plurality of times and perpendicularly extends through and is connected to each of the fins at a plurality of different locations, the doubled over ends of the refrigerant tube extending external of the ends of the fin assembly;

a housing to fixedly retain the fin assembly and refrigerant tube therein, the housing having a main air inlet communicating with one side of the fin assembly parallel to the fins and an air outlet communicating with another side of the fin assembly parallel to the fins;

a fan mounted in the housing to force air therethrough; and

a precooling chamber defined by the housing and one of the ends of the fin assembly and having a secondary air inlet and an outlet communicating with at least one of the main air inlet and air outlet , said doubled over ends of the refrigerant tube protruding into the precooling chamber.

4,027,501

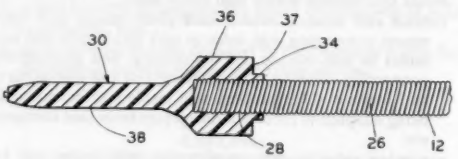
METHOD FOR JOINING A TIP FOR A FLEXIBLE SHAFT AND ASSEMBLY THEREOF

Paul N. Hanebuth, Hendersonville, N.C., assignor to Stewart-Warner Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 370,989, June 18, 1973, abandoned. This application Nov. 25, 1974, Ser. No. 526,878

Int. Cl.² F16C *1/10, 1/02, 1/08*

U.S. Cl. 64—4 **5 Claims**



1. A method for ensuring concentricity between a flexible shaft and a coupling, for transmitting rotary moton from said shaft to a magnet shaft rotatably positoned in a speedometer boss, including the steps of forming a flexible shaft, forming a casing for carrying said flexible shaft, forming a ferrule adapted to be fixed to one end of said boss, fixing said ferrule to said boss, forming a noncircular axial passageway in said magnet shaft, and a rigid thrust washer secured in said ferrule, molding a plastic coupling coaxially to one end of said flexible shaft but separate therefrom, simultaneously molding an integral rigid bearing boss on said coupling at one end for rotatable support in said washer, simultaneously molding an inte-

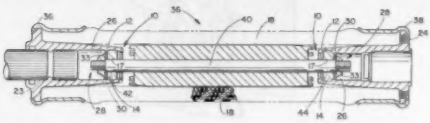
gral rigid radial shoulder on said coupling for engagement with said washer to limit movement of said coupling toward said casing, and simultaneously forming a noncircular coaxial projection on said coupling for engagement in said noncircular magnet shaft passageway for rotating said magnet shaft in response to rotation of said flexible shaft.

4,027,502

CENTERING DEVICE FOR TUBULAR FLEXIBLE ELEMENT COUPLINGS

Robert E. Stuemky, Elizabeth, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed Feb. 17, 1976, Ser. No. 658,634
Int. Cl.² F16D *3/02*
U.S. Cl. 64—8 **5 Claims**



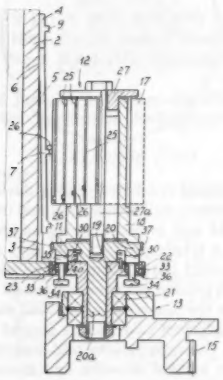
1. A centering device for tubularly shaped flexible element couplings comprising:
- a socket;
- a ball retained in the socket, the ball having an axial aperture;
- means for connecting the socket to a first end of the flexible element;
- pin means with a first and extending axially through the axial aperture of the ball;
- adjustable stop means with a radial extension that is greater than the diameter of the axial aperture secured to the first end of the pin means for preventing the pin means from extracting from the aperture; and
- means for connecting a second end of the pin means to a second end of the flexible element.

4,027,503

PATTERN DRUM WITH PATTERN SIZE INCREASING APPARATUS

Riccardo Tenconi, Via Tallera, 19, Bobbiate-Varese, Italy

Filed July 19, 1974, Ser. No. 490,162
Claims priority, application Italy, July 25, 1973, 27084/73
Int. Cl.² D04B *15/74*
U.S. Cl. 66—50 B **3 Claims**



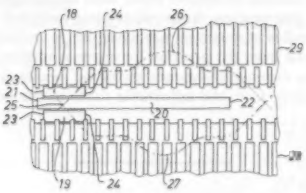
1. A circular knitting machine for manufacturing knitted fabrics having a pattern thereon, comprising a needle cylinder having longitudinal grooves and needles and selector jacks slidable within a number of said grooves, thereby difining a needle fitted out portion of said needle cylinder and a needle free portion thereof, said selector jacks being grouped in groups around the needle cylinder and each having a butt, the butts of adjacent selector jacks of each group being arranged at different heights, at least one pattern drum disposed peripherally with respect to said needle cylinder and provided with a plurality of pattern teeth for engagement with said butts to cause selection of the needles according to the pattern to be reproduced on the fabric, said at least one pattern drum having said pattern teeth disposed along vertical lines spaced by an extent equal to the distance between two adjacent needles of said needle cylinder, a support structure rotatably arranged around said needle cylinder and rotatably supporting said at least one pattern drum, means for rotating said support sturcture, means for causing said at least one pattern drum to revolve relative to said needle clinder during rotation of said support structure around said needle cylinder, means at said needle free portion of said needle cylinder for partially rotating said at least one pattern drum relative to said needle cylinder after a relative revolution of said at least one pattern drum about the circumferential extent of said needle fitted out portion of said needle cylinder so as to cause a given pattern tooth of said at least one pattern drum engaging a selector jack at a given time to become phase displaced with respect to said selector jack by an extent at least once the distance between two adjacent needles after a complete relative revolution of said at least one pattern drum about the whole circumferential extent of said needle cylinder, and means for resetting said at least one pattern drum and said needle cylinder in the condition in which said given selector jack newly engages said pattern tooth after a determined number of relative revolutions of said at least one pattern drum about said needle cylinder.

4,027,504

STITCH PRESSER FOR KNITTING MACHINE

Robert Dietschy, Grand'rue 14, and Georges Hexel, Rue du Progres 13, both of 2108 Couvet, Switzerland

Filed July 12, 1976, Ser. No. 704,171
Int. Cl.² D04B *7/04*
U.S. Cl. 66—64 **10 Claims**



1. An improved stitch presser for a knitting machine equipped with the following:
- at least two needle beds arranged in an inverted V-shape;
- needles capable of intersecting during their upward movement;
- a carriage movable above the needle beds;
- a system for control of the needles during their displacement in alternate directions;
- a stitch presser which acts between the two needle beds on the stitches held by the needles; and
- means for alternate control of the stitch presser in a position adequate for the movement of said stitch presser along a row of needles and in another position adequate for the movement in the opposite direction;
- wherein the stitch presser comprises a slide thread for pressing the knitwear and a supplementary means for pressing the stitches against the needle beds, the field of action of the supplementary means being at least partially superimposed over the field of action of the slide thread and

whose field of action starts ahead of the first point of crossing of the needles, seen in the moving direction of the carriage.

4,027,505

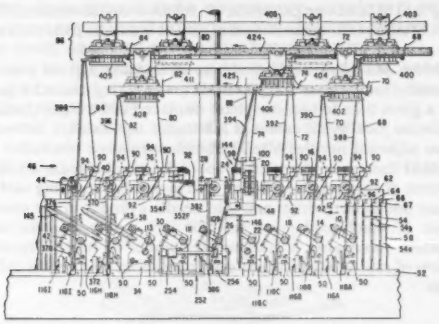
CIRCULAR KNITTING MACHINE WITH DISENGAGING POSITIVE YARN FEEDING MEANS

Lester Mishcon, Miami Beach, Fla., and John Christopolous, Charlotte, N.C., assignors to The Singer Company, New York, N.Y.

Division of Ser. No. 564,020, April 1, 1975. This application Feb. 24, 1976, Ser. No. 660,732

Int. Cl.² D04B *15/48*

U.S. Cl. 66—125 R **5 Claims**



1. In a circular knitting machine a plurality of needle actuating cam means each including an adjustable cam, needles at each cam means, a yarn for the needles at each of the cam means, means for positively feeding such yarns, means operable for moving each adjustable cam into a position wherein the adjustable cam causes needles to be moved to a knit position and for withdrawing such adjustable cam from said position to enable the needles to assume other than the knit position, and means for disengaging the positive feed means from a yarn feed for needles at a cam means when the included adjustable cam is moved from the position for moving needles to the knit position, the disengaging means including mechanical connections extending from the adjustable cams to the positive feed means.

4,027,506

DRAW-OFF AND TAKE-UP ARRANGEMENT FOR CIRCULAR KNITTING MACHINES

Hans Eugen Bitzer, Schorndorf, Germany, assignor to Firma C. Terrot Sohne, Stuttgart, Germany

Filed Oct. 14, 1975, Ser. No. 621,755

Int. Cl.² D04B *15/88*

U.S. Cl. 66—149 R **3 Claims**

1. A knitted fabric draw-off and take-up arrangement for circular knitting machines, comprising in combination,

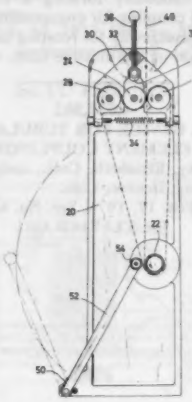
a support structure;

an idle take-up roller rotatably mounted in said support structure;

at least one draw-off roller rotatably mounted in said support structure, the axes of said take-up roller and draw-off roller being parallel;

driving means operatively connected to said draw-off roller for drivingly rotating the latter;

said arrangement being adapted to withdraw tubular knitted fabric from a circular knitting machine and to guide it as least partially around the draw-off roller and then at least partially around the take-up roller and then again at least partially around the draw-off roller and then is wound on



the take-up roller, so that the tubular knitted fabric drives the idle take-up roller.

4,027,507

AIR-AND-LIQUID COMBINED SEALING DEVICE FOR HIGH PRESSURE STEAMER

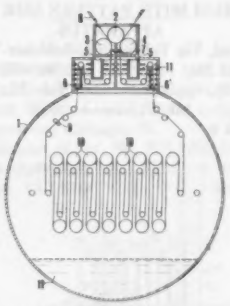
Yoshikazu Sando, and Hiroshi Ishidoshiro, both of Wakayama, Japan, assignors to Sando Iron Works Co., Ltd., Wakayama, Japan

Filed Oct. 3, 1975, Ser. No. 619,457

Claims priority, application Japan, Oct. 7, 1974, 49-115301; Feb. 27, 1975, 50-24293

Int. Cl.² D06B *23/18*

U.S. Cl. 68—5 E **2 Claims**



1. An air-and-liquid combined sealing device comprising a high pressure steamer, wall means mounted on said high pressure steamer, said wall means defining an enclosed passageway and having a textile product inlet into said passageway and a textile product outlet from said passageway into said steamer, seal rolls located at the inlet into said passageway and forming a seal for the passageway, said wall means comprising an air chamber adjacent said inlet, a second chamber at the outlet from said passageway into said steamer, and a liquid treating chamber located between and communicating with said air chamber and said second chamber, and said passageway extending serially through said air chamber, said liquid treating chamber and said second chamber for conveying a textile product from said inlet to said outlet and into said steamer.

4,027,508

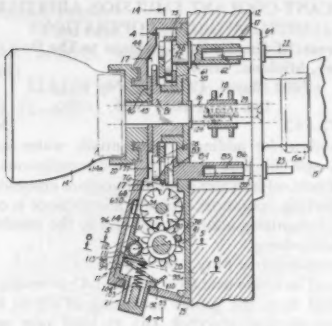
PUSH-BUTTON COMBINATION LOCK

Thomas K. McGourty, 1640 Cox Road, Aptos, Calif. 95003

Filed Nov. 20, 1975, Ser. No. 633,638

Int. Cl.² E05B *37/02, 37/16*

U.S. Cl. 70—214 **14 Claims**



1. A combination lock comprising

a locking device movable from a first position to a second position,

a plurality of rotatable locking elements in the path of said device,

each of said elements having a notch therein for permitting movement of said device to said second position when all said notches are in predetermined positions,

a plurality of push buttons for corresponding ones of said locking elements,

setting means operable by each of said push buttons upon actuation thereof for incrementally rotating all of said elements except the said element corresponding to the actuated push button,

an additional rotatable locking element in the path of said device,

said additional element having a notch therein for permitting movement of said device to said second position when said last mentioned notch is in a predetermined position, and

means operable by each of said push buttons upon actuation thereof for invariably incrementally rotating said additional element.

4,027,509

CYLINDER LOCK FOR ROTARY SWITCHES

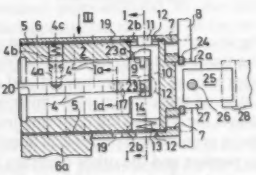
Adolf Funk, and Heinz Kuster, both of Wetzikon, Switzerland, assignors to Bauer Kaba AG. Sicherheits-Schliessysteme, Switzerland

Filed June 23, 1976, Ser. No. 698,918

Claims priority, application Switzerland, July 2, 1975, 8606/75

Int. Cl.² E05B *17/04*

U.S. Cl. 70—379 R **13 Claims**



1. A cylinder lock for a rotary switch of the type having a stationary part and a movable part rotatable to any one of a predetermined number of positions, the lock comprising the combination of

a stationary housing coupled to the stationary part of said switch,

a stator mounted for rotary motion in said housing and coupled to the movable part of said switch;

means for restraining said stator against axial motion relative to said housing;

a rotor mounted in said stator for rotary motion relative thereto,

said rotor having an operator link attached thereto and rotatable therewith, and

a key slot to permit insertion and removal of a key in any one of a plurality of rotational positions of said rotor, the positions of said key slot providing a visible indication of switch position;

tumbler means in said rotor and stator for preventing relative motion therebetween in the absence of a key in said slot;

a locking bolt coupled to said link,

said stationary housing having means defining a plurality of locking openings corresponding to the number of switch positions for receiving an end of said bolt,

said locking bolt being transversely movable between a first portion in which said bolt engages one of said locking openings in said housing and a second position in which said bolt is disengaged from said openings,

said bolt being movable toward said second position by said link upon rotation of said rotor;

spring means for urging said bolt toward said first position;

said stator being locked against rotation by said bolt when said bolt is in said first position,

said stator, said rotor and said bolt being rotatable relative to said housing when said bolt is in said second position to move said switch to a new position,

the number of said locking openings being selectable independently of the number and arrangement of tumbler means in the cylinder lock.

4,027,510

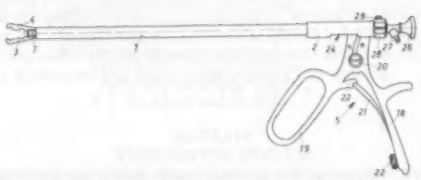
FORCEPS

Siegfried Hiltebrandt, August-Lammle-Strasse 16, 7134 Knittlingen, Germany

Filed May 15, 1974, Ser. No. 470,176

Int. Cl.² A61B *1/06, 17/42*

U.S. Cl. 72—37 **1 Claim**



1. A forceps instrument comprising in combination,

a. an outer sleeve member,

b. a guiding viewing-tube support, tubular in shape, and mounted concentrically within said outer sleeve,

c. a tubular barrel mounted within said outer sleeve substantially concentrically around and axially slidable along said guiding viewing-tube support,

d. optical viewing means including a viewing tube immoveably mounted on and substantially concentrically within said guiding viewing-tube support and extending substantially centrally therethrough such that an uninterrupted line-of-sight is provided therethrough,

e. a pair of separately pivotally mounted opposing jaws mounted on a distal end of said guiding viewing-tube support and being pivotal apart from and toward one another on opposite sides of said uninterrupted line-of-

sight, said jaws being adapted, in an open state, for receiving a tantalum clip therebetween, each of said opposing jaws being further provided with a longitudinally extending jaw limb which is releasably mounted in a correspondingly-shaped, longitudinally extending recess in the outer periphery of said guiding viewing-tube support at its distal end,

f. locking means for retaining said jaw limbs in said logitudinal recesses, said locking means comprising a locking ring mounted in an annular groove provided in the outer periphery of said guiding viewing-tube support in surrounding relationship to said jaw limbs, and

g. hand-operated jaw actuation means comprising a first lever element fixedly mounted on a proximal end of said outer sleeve, and a second lever element pivotally mounted on said first lever at an intermediate point thereon, said levers being further interconnected by spring means which biases them into an open position, said second lever being provided at one end with a U-shaped projection which extends through a cut-out in said proximal end of said outer sleeve and said projection is permanently attached to a proximal end of said tubular barrel so that, upon pivotal actuation of said second lever toward said first lever against the bias of said spring means, said tubular barrel is moved along said guiding viewing-tube support in a distal direction to close said jaws and thereby crimp said tantalum clip positioned therebetween, and upon release of said lever, said spring means biases and thereby moves said tubular barrel in a proximal direction along said guiding viewing-tube support and thereby opens said jaws, and the entire crimping operation of the jaws is viewed through said optical means.

4,027,511

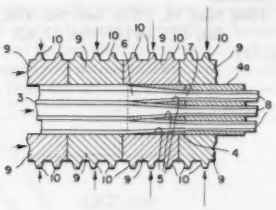
APPARATUS FOR PRODUCING MULTIPLE ELONGATED PRODUCTS SUCH AS WIRES

Francis Joseph Fuchs, Jr., Princeton Junction, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Division of Ser. No. 523,401, Nov. 13, 1974, Pat. No. 3,964,283. This application Mar. 31, 1976, Ser. No. 672,564

Int. Cl.² B21C *23/08, 23/32*

U.S. Cl. 72—41 **8 Claims**



1. Apparatus for simultaneously producing a plurality of elongated products from a plurality of elongated billets, said apparatus comprising:

first means for assembling said plurality of elongated billets in the form of a bundle with effective surface engagement between adjacent elongated billets included in said bundle;

a die having an entrance end for receiving said bundle and having a plurality of laterally spaced die apertures extending therethrough, each die aperture being so disposed as to register with a different one of said elongated billets in the bundle; and

second means for applying a frictional drag force along the outer periphery of said bundle of billets in the direction of the entrance end of the die such that said effective surface engagement between adjacent elongated billets included in said bundle will cause each of the billets to advance toward its respective die aperture as a part of said bundle and then to pass through said respective die aperture, whereby a plurality of elongated products will be produced simultaneously.

4,027,512

LUBRICANT-COOLANT EMULSION ADDITIVE FOR METAL WORKING OPERATIONS

Lyle G. Treat, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 4, 1976, Ser. No. 683,122

Int. Cl.² C10M *1/06, 1/08*

U.S. Cl. 72—42 **36 Claims**

1. A method for adding a substantially water-immiscible fatty acid-type lubricity agent to the discontinuous neat oil phase of a neat oil-in-water lubricant-coolant emulsion for use in metalworking operations wherein a workpiece is contacted by a tool, comprising adding a solution to the emulsion, said solution comprising

A. at least one free fatty acid and

B. a liquid in which said Component (A) is readily soluble, selected from the group consisting of (i) at least one polyoxyalkylene glycerol, (ii) at least one monoalkyl ether of a polyoxyalkylene glycol where the alkyl group has at least four carbon atoms and the alkylene group has at least two repeating units, and (iii) diethylene glycol di-t-butyl ether, said liquid being further characterized in that it is compatible with the emulsion, with the workpiece, and with the tool,

the concentration of Component (A) in the solution and the amount of solution added to the emulsion being mutually selected so that sufficient fatty acid-type lubricity agent is added to the oil phase of the emulsion to attain a preselected concentration of the fatty acid-type lubricity agent in the oil phase of the emulsion without adversely affecting the emulsion.

4,027,513

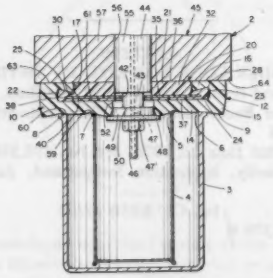
SEALING DEVICE FOR CAN TESTING MACHINES

Robert B. De Ment, Steger, and William D. Simms, Chicago, both of Ill., assignors to Kastalon Inc., Alsip, Ill.

Filed Mar. 31, 1976, Ser. No. 672,111

Int. Cl.² G01M *3/32*

U.S. Cl. 73—49.8 **10 Claims**



1. A sealing assembly suitable for use in a can body testing machine of the type adapted to pass fluid through the can, said assembly comprising an interior support and an exterior elastomeric pad sleeved thereon for positioning over the rim of a can, said pad and support having opposing interfaces and one of said interfaces presenting a peripheral annular apical axially directed edge portion and the other interface having a surface deformable against said edge portion attendant to compaction of the support and pad between a can body and an opposing machine surface to a shape conforming to said one interface to provide a leak-proof seal therebetween, said pad being

resilient along the surface thereof engageable with the rim of the can so as to establish a hermetic seal therewith.

4,027,514

DEVICE FOR CONTINUOUS EXTRUSION

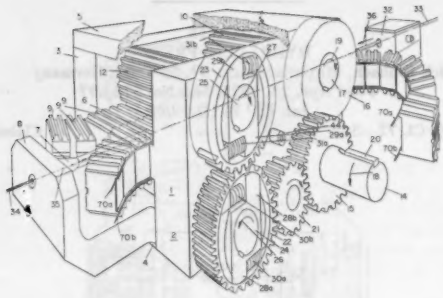
Marc Moreau, Asnieres, France, assignor to Trefimetaux, Argenteuil, France

Filed Sept. 1, 1976, Ser. No. 719,522

Claims priority, application France, Dec. 12, 1975, 75.39401

Int. Cl.² B21D *15/06;* B65H *17/34*

U.S. Cl. 72—60 9 Claims



1. A device for the continuous extrusion of an object of indefinite length into another object of indefinite length and of smaller cross section, the object in the process of treatment deforming under the effect of two forces, one resulting from a high pressure prevailing in an elongated pressure cylinder in which the object in the course of treatment moves, the other resulting from the movement of movable elements delimiting between them the pressure cylinder, this movement developing, in a fluid under pressure surrounding the object in its passage in the pressure cylinder, a force directed in the direction of movement of the object and forcing the object through a die; the said device having a resistant body including an upstream entrance and a downstream exit, said resistant body being capable of resisting a high pressure, the resistant body having an internal cross-section with elongated machined surfaces therein in the direction of its length; movable elements moving in the resistant body from upstream to downstream thereof and describing outside it a return path which brings them back upstream, said movable elements being constituted by two lateral series of elements which, associated in opposed twos, have an external cross section corresponding to the internal cross section of the resistant body and delimit in the longitudinal axis of the device a pressure cylinder having a cross section slightly greater than that of the object to be extruded, said pressure cylinder being formed by recesses hollowed out on the internal face of each of two associated movable elements, each movable element having, toward the top and toward the bottom of its lateral surface, a machined surface slidable without friction and without play along the corresponding machined surface of the resistant body, the movable elements having lower and upper surfaces with teeth thereon orientated perpendicular to the direction of their movement, the opposite lateral faces of the movable elements and of the resistant body delimiting a space termed a pressure chamber which receives a fluid under pressure which, exerting a force perpendicular to the longitudinal axis of the device presses one movable element against the associated movable element, two drive pinions driving the movable elements introduced into the resistant body toward the downstream end of the latter, one drive pinion acting on the teeth of the upper face of the movable elements, the other on the teeth of the lower face of these elements, brake means braking the movable elements downstream of the resistant body, said brake means comprising two shaft mounted resistant pinions, one engaged with and being driven by the teeth of the upper face of the movable elements, the other engaged with and being driven by the teeth of the lower face of these elements, loose crowns fitted onto the shaft of these pinions, means developing an elastic torque between each loose crown and its shaft, and means driving each loose crown in a movement identical in direction and speed to the shaft which carries it; and a die located at the downstream exit of the resistant body and blocking the pressure cylinder.

4,027,515

DEVICE FOR ELECTRICAL DISCHARGE FORMING

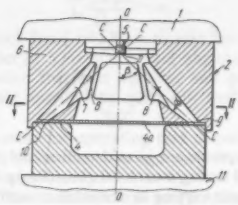
Viktor Nikolaevich Chachin, bulvar Lunacharskogo, 8, kv. 21; Gennady Nikolaevich Zdor, ulitsa V.Khoruzhei, 19, kv. 14; Alexandr Julyanovich Zhuravsky, Partizansky prospekt, 28, korpus 2, kv. 135; Elena Yakovlevna Golovkina, ulitsa Kakhovskaya, 37, kv. 42, and Vladimir Leontievich Shaduya, ulitsa Pervomaiskaya, 8, kv. 7, all of Minsk, U.S.S.R.

Filed May 3, 1976, Ser. No. 682,471

Claims priority, application U.S.S.R., May 11, 1975, 2132196

Int. Cl.² B21D *26/02*

U.S. Cl. 72—56 3 Claims



1. A device for electrical discharge forming comprising: a fixed plate; an explosion chamber mounted on said fixed plate; an appliance for creating an explosion; a work-holding die pressed against said explosion chamber in the process of forming; an appliance for pressing said die against said explosion chamber; at least two channels whose cross section changes gradually over their length, said channels being made in the wall of said explosion chamber; said channels arranged at an acute angle to the geometrical axis of said explosion chamber so that their wider ends are directed into said explosion chamber and are in essence equispaced around its perimeter and so that the other, narrower ends of said channels are directed to said die and are in essence equispaced around its perimeter near the zone of the work so that the impact wave created by the explosion passes through said channels and acts on the face surfaces of the work in the course of its shaping.

4,027,516

VISCOMETER SYSTEM

Samuel Steven Ochodnicky, Dearborn Heights, and Frank Joseph Bianchi, Jr., Redford Township, both of Mich., assignors to Gam Rad, Inc., Detroit, Mich.

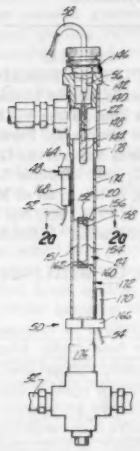
Filed Mar. 16, 1976, Ser. No. 667,528

Int. Cl.² G01N *11/12*

U.S. Cl. 73—57 9 Claims

1. A viscometer system operable with a process line carrying a fluid to be measured and comprising a vertically mounted fall tube, a slug located in said fall tube for movement therein between upper and lower positions, pump means for pumping fluid into said fall tube, valve means operable to a plurality of conditions for directing flow of fluid from said fall tube, conduit means connecting said pump means, said valve means, said fall tube and the process line, actuating means operably connected with said fall tube, said pump means, said valve means and said conduit means for automatically, sequentially placing the system in the following phases of operation: (a) purge phase in which said valve means is

conditioned such that fluid is pumped by said pump means from the process line, through said fall tube, and through said valve means back to the process line, (b) recirculate phase in which said valve means is conditioned such that fluid flow to the process line is blocked and fluid is recirculated in a fluid circuit comprising said fall tube, said valve means, said conduit means and said pump means, and (c) measure phase in which said pump means is deactuated while the remaining



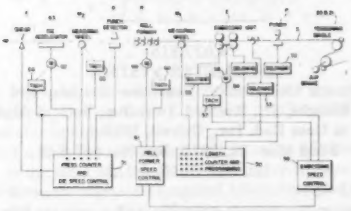
portions of the system are in said recirculate phase and said slug can fall, and timing means for providing a voltage output having a magnitude varying in accordance with the variations in the elapsed time for said slug to fall a selected distance, said timing means comprising a pair of magnetically actuated switches connected to said fall tube, each of said switches being independently movably mounted and capable of variation in both vertical and circumferential location.

4,027,517

METHOD AND APPARATUS FOR EMBOSSING SHEET METAL STRIP AND SHEET METAL PANEL

Ernest Robert Bodnar, R.R. No. 1 Kingsworth Road, Kingscross Estates, King City, Canada

Continuation-in-part of Ser. No. 431,098, Jan. 7, 1974, abandoned. This application May 27, 1975, Ser. No. 580,709
Int. Cl.² B21D *21/00*
U.S. Cl. 72—177 **23 Claims**



1. The method of cold forming a continuously moving strip of sheet metal to form successive transverse indentations in a central portion thereof and longitudinal formations down the two side portions thereof said method comprising;

forming a series of transverse indentations in a central portion of said strip by the closing action of continuously moving die means at a forming station while said strip sheet metal is moving along a predetermined path, and while simultaneously holding said strip in tension between two spaced points on opposite sides of said forming station whereby to prevent distortion of said strip during formation of said transverse indentations;

subsequently roll forming continuous longitudinal formations in said side portions of said sheet metal strip which remain free of said transverse indentations, said longitudinal formations extending continuously along both said side portions of said strip, and,

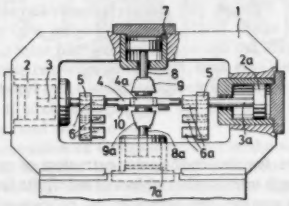
intermittently discontinuing said formation of said transverse indentations at predetermined spaced intervals along said sheet metal strip, whereby to leave lengths of said central portion between said continuous longitudinal formations which are flat and planar and free of said transverse indentations at spaced intervals therealong.

4,027,518

HYDRAULIC PRESS

Erich Ribback, Maximiner Acht 39, 55 Trier, Germany

Filed Apr. 23, 1975, Ser. No. 570,697
Int. Cl.² B21D *19/00*
U.S. Cl. 72—306 **3 Claims**



1. A hydraulic press for metal working of end portions of rod-like or pipe-like metallic work pieces, comprising:

a central clamping means for arresting the work piece including two oppositely disposed horizontal hydraulic cylinders having piston rods, clamping jaws mounted on said front facing ends of said piston rods of said hydraulic cylinders, the latter constituting clamping cylinders, said clamping jaws being adjusted to the form of a center section of said work piece solely for the support thereof without absorption of any pressure forces therefrom and including round shoulders for supporting a ring-like center section of said work piece whereby to avoid collapse of the ring-like center section thereof;

two oppositely disposed hydraulic press cylinders having piston rods which move toward the work piece;

individual working tools disposed on said piston rods of said press cylinders, said individual tools having a shape of a conical draw-in ring having a small conical angle at a range of an inlet opening for said work pieces, and in a center section having a plurality of radially inwardly extending ribs, and in an end section having a second conical angle larger than said small conical angle, said inlet opening having a diameter at least 1.3 times greater than the diameter of said outlet opening to provide a deformation ratio greater than 1.3, said ribs including radial extensions adjusted to and coordinated with the smallest diameter of said end section of said draw-in ring, whereby folds which are created on the outer circumference of the work piece in said end section of the draw-in ring by said ribs are completely closed on the outer circumference of the work piece,

said press cylinders including said piston rods thereof being disposed on both sides of said clamping means;

means for moving said piston rods of said press cylinders toward each other in a longitudinal direction of said work piece; and

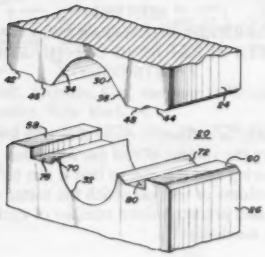
means laterally moving said hydraulic cylinders in axial alignment with each other with respect to the longitudinal direction of said work piece whereby to avoid the absorption of any forces by said clamping means.

4,027,519

MEANS AND METHOD FOR REDUCING THE PERIMETER OF A HOLLOW THIN WALLED MEMBER

Walter Bachle, Harwinton, Conn., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed Sept. 22, 1976, Ser. No. 725,627
Int. Cl.² B21D *37/10*
U.S. Cl. 72—367 12 Claims



9. A method of reducing the perimeter of a hollow thin walled member comprising the steps of: pinching a longitudinal portion of the wall of a hollow thin walled member between a pair of selectively spaced, parallel surfaces so located adjacent the periphery of said hollow thin walled member that a central plane lying between and parallel to said parallel surfaces is oriented parallel to the longitudinal axis of said hollow thin walled member and oblique to a radial axis extending from the center of said hollow thin walled member to said central plane to form an obliquely angled fin thereat; and applying an inwardly directed radial force to said fin to cause said fin to fold inwardly against the outer surface of said hollow thin walled member.

4,027,520

BLIND RIVETER WITH AUTOMATIC RIVET FEED

Günter Klein, Walldorf, Hessen, Germany, assignor to GESIPA Blindniettechnik Gesellschaft mit beschrankter Haftung, Frankfurt, Germany

Filed Sept. 2, 1975, Ser. No. 609,536
Claims priority, application Germany, Aug. 30, 1974, 2441707; Aug. 30, 1974, 7429354[U]
Int. Cl.² B21J *15/34*
U.S. Cl. 72—391 13 Claims

1. A blind riveter comprising:

a housing having a front end and formed adjacent said end with a chamber;

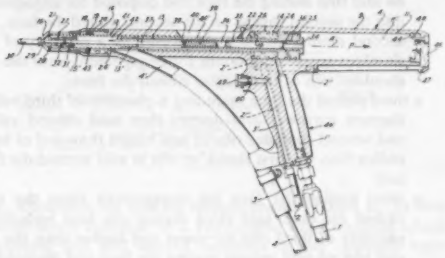
a plurality of outwardly deflectable holding elements at said front end normally defining a forwardly opening aperture dimensioned to fit around the mandrel of a blind rivet;

a chuck in said chamber locking engageable with a blind-rivet mandrel;

actuating means in said housing connected to said chuck for displacing same between a front position lockingly engaged around a mandrel extending back into said chamber through said aperture from a blind rivet having a head resting against said holding elements and a back position spaced from said aperture by a distance greater than the length of a blind rivet with its mandrel, whereby displacement from said front to said back position with said chuck gripping a mandrel pulls the mandrel back in its rivet and upsets the rivet;

a rivet feed duct opening into said chamber in back of said aperture and forwardly of said chuck in said back position, said duct extending backwardly from said front end;

means for holding a supply of blind rivets and for separating individual rivets from said supply and feeding one rivet through said duct to said chamber each time said chuck is displaced into said back position, whereby displacement



of said chuck from said back to said front position after introduction of a rivet into said chamber engages said chuck around the rivet mandrel and pushes the rivet through said aperture by outwardly deflecting said elements and

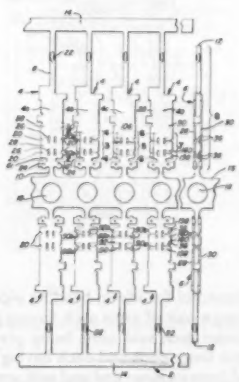
pneumatic means for operating said actuating means and said means for feeding and triggerable for each operation cycle to displace said chuck to upset a rivet, dislodge a broken-off mandrel therefrom and position a new rivet in said chuck automatically for a single stroke of said actuating means.

4,027,521

APPARATUS FOR MAKING TERMINAL CONNECTORS

William H. McKee, West Covina, Calif., and Anthony E. Schubert, Villa Park, Ill., assignors to TRW Inc., Elk Grove Village, Ill.

Division of Ser. No. 545,353, Jan. 30, 1975, abandoned. This application Jan. 9, 1976, Ser. No. 647,799
Int. Cl.² B21D *13/02*
U.S. Cl. 72—404 2 Claims



1. A set of progressive dies for forming resiliently biased wire contacting jaws in an electrical terminal comprising:

a first ribbed die face including a plurality of first valleys intermediate the ribs,

a first mating die face for engagement upon the first ribbed die face, said first mating die face including a plurality of ribs disposed for engagement into the first valleys on the first ribbed die face,

a second ribbed die face including a plurality of second valleys thereon narrower and deeper than said first valleys on the first ribbed die face and first shoulder ribs along the outer edges of the outermost second valleys,

a second mating die face for engagement upon the second ribbed die face, said second mating die face including a plurality of second ribs narrower and higher than the ribs on said first mating die face and disposed for engagement into the second valleys on the second ribbed die face, said second mating die face also including a plurality of first shoulder receiving grooves for engagement onto the first shoulder ribs of the second ribbed die face,

a third ribbed die face including a plurality of third valleys thereon narrower and deeper than said second valleys and second shoulder ribs of less height than and of lesser radius than the first shoulder ribs in said second die face, and

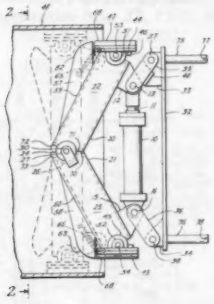
a third mating die face for engagement upon the third ribbed die face, said third mating die face including a plurality of third ribs narrower and higher than the second ribs on said second mating die face and disposed for engagement into the third valleys on the third ribbed die face, said third mating die face also including a plurality of second shoulder receiving grooves for engagement onto the second shoulder ribs of the third ribbed die face.

4,027,522

INTERNAL MANDREL FOR USE IN BENDING THE ENDS OF PIPES

Edward A. Clavin, Houston, Tex., assignor to Midcon Pipeline Equipment Co., Houston, Tex.

Filed Nov. 14, 1975, Ser. No. 631,883
Int. Cl.² B21B 25/00; B21D 9/00
U.S. Cl. 72—466 **19 Claims**



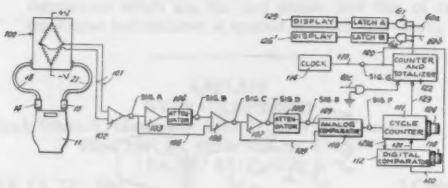
1. Internal mandrel for use in bending pipes adjacent their ends, comprising a pair of arms each having pipe engagement means at its outer end, said arms being pivotally connected together at their inner ends and each having a laterally offset portion spaced from its inner end and said arms being movable between in line extended positions and retracted equal angular positions to one side of said in line positions, and actuator means connected between said laterally offset portions of said arms for moving said arms between said extended and retracted positions.

4,027,523

METHODS AND APPARATUS FOR PROOF TESTING GAS METERS

Theodore A. St. Clair, Fairfield, Conn., assignor to Textron, Inc., Providence, R.I.

Filed Nov. 12, 1975, Ser. No. 631,498
The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.
Int. Cl.² G01F 25/00
U.S. Cl. 73—3 **7 Claims**



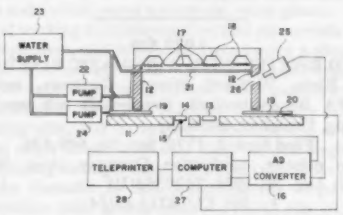
7. Apparatus as defined in claim 3 in which there are means for displaying the volume of test gas which has passed through the meter during said test run so that it can be compared with the known volume of test gas which the meter was designed to pass during said predetermined number of cycles of operation of the valve mechanism.

4,027,524

APPARATUS FOR DETERMINING THERMOPHYSICAL PROPERTIES OF TEST SPECIMENS

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Theodore R. Creel, Jr., Yorktown; Robert A. Jones, Newport News, both of Va.; Richard R. Corwin, Xenia, and Joseph S. Kramer, Dayton, both of Ohio

Filed Feb. 27, 1976, Ser. No. 662,175
Int. Cl.² G01N 25/18
U.S. Cl. 73—15 R **7 Claims**



1. Apparatus for directly measuring the quatity $\sqrt{\rho ck}$ of a test specimen where ρ is the density, c is the specific heat and k is the thermal conductivity of the specimen comprising:

a reference specimen;

a heat source;

means for simultaneously subjecting said test specimen and said reference specimen to said heat source;

means attached to said reference specimen for producing a first electrical analog signal proportional to the heating rate $\dot{Q}$ that said test specimen is subjected to;

infrared radiometer means aimed at said test specimen for producing a second electrical analog signal proportional to the surface temperature T of said specimen; and

computer means receiving said first and second analog signals for calculating $\sqrt{\rho ck}$ in accordance with the equation:

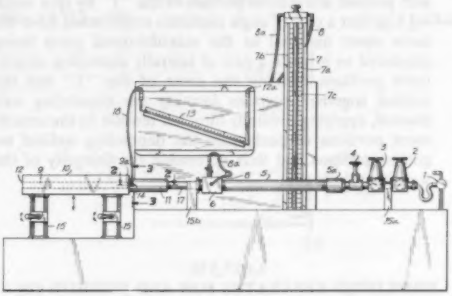
$$\sqrt{\rho ck} = \frac{\dot{Q}}{T - T_i} \frac{2}{\sqrt{\pi}} \sqrt{t}$$

where T_i is the initial test specimen temperature and t is the elapsed time from the time that the specimens are subjected to the heat source.

4,027,525
METHOD AND APPARATUS FOR DETERMINING THE RELATIVE ROUGHNESS OF HOLES IN REFRACTORY COMPOSITIONS

Richard T. Mull, Augusta, Ga., assignor to Great Lakes Carbon Corporation, New York, N.Y.

Filed May 21, 1975, Ser. No. 579,493
Int. Cl.² G01M *13/00*
U.S. Cl. 73—37 **4 Claims**



1. An apparatus for determining the frictional resistance to a flow of gas through an internal passage extending through a solid body of extended length which comprises:

a source of gas at shop pressure;

a gas tight fluid circuit connected between said source and the inlet to said passage operative to provide a flow of predetermined characteristics through said passage to the atmosphere including:

a three stage pressure regulating means including a first pressure regulator connected to said source, a second pressure regulator connected to the outlet of said first pressure regulator and a valve connected to the outlet of said second pressure regulator, said pressure regulators and said valve cooperating to minimize undesireable pressure fluctuation from said source;

a velocity orifice plate in fluid communication with said pressure regulating means and downstream thereof for maintaining a flow rate in said circuit of sufficiennt quantity to provide a fully developed turbulent flow in said circuit downstream of said velocity orifice plate;

first and second pressure sensing means connected into said circuit at said velocity plate inlet and outlet respectively and adapted to provide measurements of the flow pressure at said plate inlet and outlet;

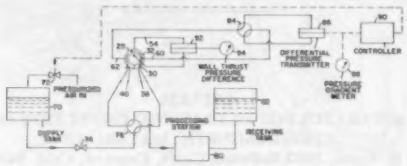
an inlet adapter in said circuit for transporting said flow from said orifice plate outlet to said passage substantially without further pressure drop, said adapter partially insertable by press fitting in said passage;

means for measuring the pressure drop of said flow through said passage from the passage inlet to the atmosphere and thereby determining the frictional resistance to said flow through said passage.

4,027,526
METHOD AND APPARATUS FOR MAKING MEASUREMENTS RELATED TO THE FIRST NORMAL STRESS FUNCTION OF VISCOELASTIC FLUID MATERIAL

Herman R. Osmers, Pittsford, N.Y., assignor to University of Rochester, Rochester, N.Y.

Filed July 8, 1976, Ser. No. 703,483
Int. Cl.² G01N *11/04*
U.S. Cl. 73—54 **13 Claims**

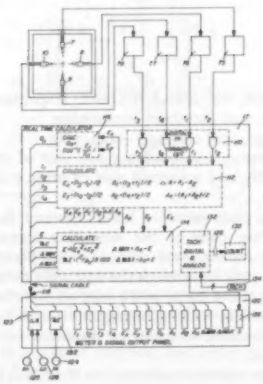


5. Apparatus for making measurements related to the first normal stress function of a viscoelastic fluid material which comprises first and second members having opposed walls which define an annular channel defining an angular path extending circumferentially about said first member, means for introducing said fluid medium under pressure into said channel to flow through said channel along said angular path, and means for measuring the thrusts exerted by said liquid against each of said walls whereby to provide said measurements.

4,027,527
SYSTEM FOR DETERMINING TUBE ECCENTRICITY

Robert F. Bennett, Leechburg; Nicholaas L. Brouwer, Apollo, and David M. Stricker, Lower Burrell, all of Pa., assignors to Aluminum Company of America, Alcoa Center, Pa.

Filed Apr. 1, 1975, Ser. No. 564,056
Int. Cl.² G01B *17/02*
U.S. Cl. 73—67.8 S **14 Claims**



1. A system for determining eccentricity characteristics of a tube comprising,

a frame,

sensing means mounted on said frame for sensing the thickness of a wall of a tube, said sensing means including at least three thickness sensors supported in sensing position with respect to said tube at predetermined angularly spaced locations with respect to each other and with the axes of the sensors intersecting at substantially the same

point for producing output signals which are related to the thickness of the tube wall at the locations sensed and, signal processing means for receiving the output signals from said sensors and translating these output signals into vector components of the eccentricity of the tube, and for summing said vector components to provide an eccentricity signal related to the magnitude and angular location of the tube eccentricity.

4,027,528

APPARATUS FOR ULTRASONIC INSPECTION OF FERROMAGNETIC MATERIALS

Bill D. Tyree, 3997 Bellwood Court, Concord, Calif. 94520

Filed Dec. 15, 1975, Ser. No. 640,726
Int. Cl.² G01N *29/04*
U.S. Cl. 73—67.8 S **1 Claim**

1. Apparatus for non-destructive inspection of vertical ferromagnetic wall members comprising:

A. a carriage, said carriage comprising

1. a mounting frame having one pair of arms extending upwardly and a second pair of arms extending downwardly,
2. a deep plate member fitted between the downwardly extending arms of the mounting frame and a shaft passing through said arms and said plate member,
3. a shaft passing through the upwardly extending arms of the mounting frame and a support member mounted on said shaft in rocking engagement with said shaft,
4. an ultrasonic transducer mounted on said support member,
5. a fender member mounted on the lower surface of said support member,
6. a shaft passing through said plate member and a wheel formed from strongly permanent magnetic material mounted on each end of said shaft,

B. an electric current carrying cable in electric connection with said transducer,

C. a waterline having an open end adjacent the face of the transducer, and

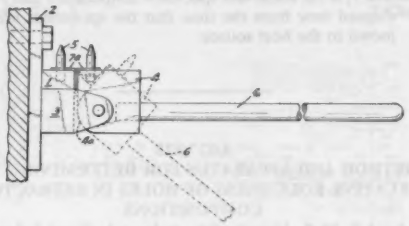
D. a telescopic pole member supporting said carriage attached to the deep plate member and so aligned that it is perpendicular to the shaft on which the magnetic wheels are mounted.

4,027,529

METHOD AND APPARATUS FOR TESTING SPOT WELDS

Robert A. Olsen, 140 Hartman Circle NE., Fridley, Minn. 55432

Filed Mar. 24, 1976, Ser. No. 669,829
Int. Cl.² G01N *3/00*
U.S. Cl. 73—88 B **3 Claims**



3. The method for testing the integrity of a spot weld produced by a welding without destruction of the manufactured sheet metal parts, said method comprising

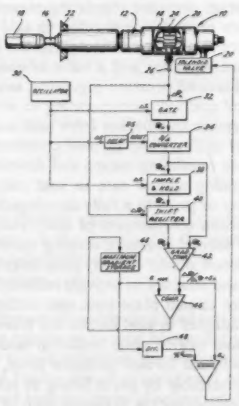
producing a T-shaped test speciman having a depending web portion and a cross portion of the "T" by spot welding together a pair of angle elements constructed from the same sheet material as the manufactured parts being produced to provide a pair of laterally extending attachment portions forming the cross of the "T" and the welded together portions forming the depending web thereof, applying pivotally directed tension to the attachment portions to peel apart the depending welded together portions and thus determine the integrity of the weld therebetween.

4,027,530

SIMPLIFIED APPARATUS FOR AND METHOD OF TIGHTENING FASTENERS

Angelo L. Tambini, Rathfarnham, Ireland, and Paul W. Wallace, Warrington, Pa., assignors to Standard Pressed Steel Co., Jenkintown, Pa.

Filed Mar. 31, 1976, Ser. No. 672,093
Int. Cl.² G01N *3/22*
U.S. Cl. 73—88 F **23 Claims**



1. Apparatus for tightening an assembly including a fastener member to a predetermined tightened condition comprising:

means for imparting angular motion to said fastener member;

means for measuring the angular displacement of said fastener member and providing a signal indicative thereof;

means for providing a signal indicative of the angular speed of said fastener member;

gradient calculating means receiving said angular displacement signal and said angular speed signal for developing a signal representative of the instantaneous gradient of the angular speed vs. angular displacement curve through which said assembly is being tightened; and

control means responsive to said gradient signal for determining the yield point or other similar significant point indicative of a significant change in slope on said curve and for developing a control signal when said assembly is tightened to said point.

4,027,531

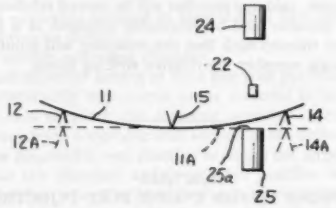
METHOD AND MACHINE FOR LOCATING VARIATIONS IN TENSION IN A SAW BLADE

Chester H. Dawson, Danbury, Conn., assignor to Remington Arms Company, Inc., Bridgeport, Conn.

Division of Ser. No. 555,155, March 4, 1975, Pat. No. 3,964,348. This application Nov. 28, 1975, Ser. No. 635,962

Int. Cl.² G01N *3/20*

U.S. Cl. 73—100 **11 Claims**



3. A machine for locating variations in tension in a circular saw blade having a major axis, said machine comprising:

carriage means constructed and arranged for mounting and elastically bowing a saw blade having a normally-planar major surface to deflect said surface toward the locus of a segment of the surface of a curved geometric solid having a specifically preselected contour, to which said blade surface would conform if the blade is properly tensioned and straightened;

sensor means constructed and arranged for detecting local deviations of said blade surface from said locus only in a limited local area of the blade surface at a time;

and means supporting said sensor means and said carriage means in operative relation for detection of said local deviations by said sensor means, said supporting means being constructed and arranged to support said carriage means and said sensor means for relative reciprocatory movement therebetween, and including means for rotating said saw blade about said major axis, to cause said sensor means to locate said local deviations in a larger area of said blade surface sequentially.

4,027,532

COMPRESSION TESTING APPARATUS

Gerald C. Trussell, Park Ridge, and Robert W. Arnston, Schaumburg, both of Ill., assignors to Sun Electric Corporation, Chicago, Ill.

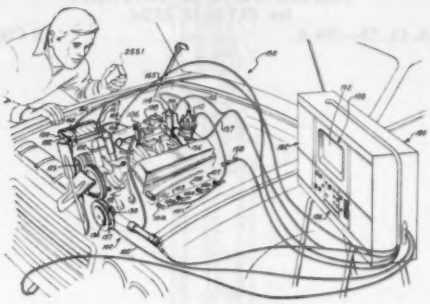
Filed Apr. 20, 1976, Ser. No. 678,670

Int. Cl.² G01M *15/00*

U.S. Cl. 73—117.2 **34 Claims**

26. Apparatus, for automatically determining the number of chambers in an internal combustion engine in which ignition signals are used to sequentially ignite fuel-air mixtures in the chambers, said apparatus comprising:

means for generating a synchronizing signal in response to each ignition signal used to ignite the fuel-air mixture in a first one of the chambers;



counting means for counting a synchronizing signal and each ignition signal occurring between two successive synchronizing signals;

memory means for storing digital data; and

processing means for transferring the contents of the counting means to the memory means after the number of chambers has been counted.

4,027,533

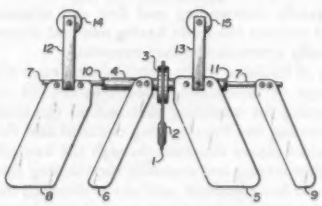
ANGLE OF ATTACK INDICATING DEVICE

John Pretto, 624 S. Belmont, Arlington Heights, Ill. 60005

Filed June 23, 1976, Ser. No. 698,840

Int. Cl.² C01W *1/00;* **B63H** *9/04*

U.S. Cl. 73—188 **10 Claims**

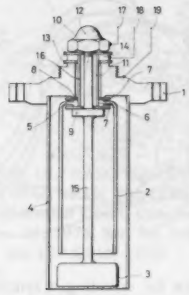


1. Apparatus for indicating the optimum attack angle for a moving fluid foil with respect to the fluid through which the foil is moving, said apparatus comprising: a first rotatable shaft connected to and positioned perpendicular to said foil; first sensing means connected to said first shaft and positioned adjacent to a first side of said foil; first indicating means connected to said first shaft and positioned adjacent to a second side of said foil; said first sensing means and said first indicating means located in the same plane; a second rotatable shaft connected to and positioned perpendicular to said foil; second sensing means connected to said second shaft and positioned adjacent to said second side of said foil; second indicating means connected to said first shaft and positioned adjacent to said second side of said foil; said second sensing means and said second indicating means located in the same plane; whereby the optimum angle of attack of said foil is indicated by parallel positioning of said first indicating means to said second sensing means, and parallel positioning of said second indicating means to said first sensing means.

4,027,534
ELECTRODE DEVICE FOR MONITORING LIQUID LEVELS

Heino Zimmermann, Bremen, Germany, assignor to Gustav F. Gerdts KG, Bremen, Germany

Filed Jan. 5, 1976, Ser. No. 646,699
Int. Cl.² G01F *23/24*
U.S. Cl. 73—304 R **10 Claims**



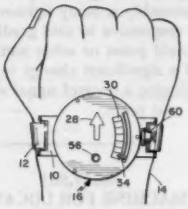
1. An electrode device for use in monitoring conductive liquids comprising:
a mounting having a central opening;
a first electrode having a tie rod portion disposed through the central opening of said mounting and insulated therefrom;
a clamping collar secured to said tie rod adjacent to one side of said mounting, said first electrode including an extending end portion connected to the clamping collar;
a second electrode in the form of a tubular sleeve coaxially surrounding said first electrode and insulated therefrom, said second electrode including an end flange at one end, and having a central opening surrounding said first electrode between its collar and said one side of said mounting, the opposite end of said second electrode being open to permit the free end of said extending end portion of said first electrode to extend from said opening;
a counter electrode in the form of a tubular sleeve and coaxially surrounding said first and second electrodes, said counter electrode having one end secured and electrically connected to said mounting;
a pair of insulated washers disposed on each side of the end flange of said second electrode coaxial to its central opening for insulating said second electrode from said mounting and the clamping collar of said first electrode;
a contact sleeve disposed through the central opening of said mounting and coaxially surrounding the rod portion of said first electrode, said sleeve disposed through one of said washer pair and supported on a second of said washer pair adjacent said clamping collar, said contact sleeve being disposed through the central opening and electrically secured to the end flange of said second electrode; and
means engaging one end of said tie rod portion for securing said first electrode to the opposite side of said mounting and for securing the end flange of said second electrode and its washer pair between said side of said mounting and said clamping collar.

4,027,535
MANUAL THRUST GAUGE

Erik Swanson, 15939 NW. 40 Court, Opa Locka, Fla. 33054

Filed Feb. 2, 1976, Ser. No. 654,713
Int. Cl.² G01L *5/06*; **G01P** *15/02*
U.S. Cl. 73—381 **8 Claims**

1. A manual thrust gauge comprising:
a. a frame;
b. means mounted on said frame for engagement on a human extremity;
c. two cooperating gauging members comprising a scale member and an indicator member both mounted on said frame, one of said members being weighted and having one portion anchored to said frame and another portion movable relative to the other of said members such that said indicator is registerable at different positions along said scale;

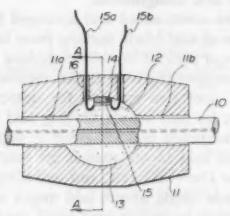


d. bias means urging said one member in one direction relative to the other of said members;
e. a releasable detent for detaining said one member against said bias means at a plurality of selectable positions relative to the other of said members, whereby upon engaging said thrust gauge on a human extremity and striking out with same, said one member will be moved relative to said other member and be releasably engaged at a position relative thereto such that the indicator will point out on said scale member the relative striking force.

4,027,536
TRANSDUCER FOR ENGINE FUEL INJECTION MONITORING

William S. Heggie, Bells Corners, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada

Continuation-in-part of Ser. No. 624,114, Oct. 20, 1975, abandoned. This application May 21, 1976, Ser. No. 688,908
The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.
Int. Cl.² G01L *9/04*
U.S. Cl. 73—398 AR **8 Claims**

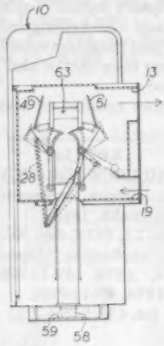


1. A fuel injection monitoring transducer for mounting on the fuel injection lines of engines comprising:
a. a barrel-shaped housing made of a strong metal material encompassing the fuel line tube and fixedly attached to the tube circumferentially at outer positions and defining an enclosed annular volume between tube and housing,
b. a pressure measuring element positioned in the said volume away from the fuel tube and adjacent the inner wall of the housing,
c. a solid cold flowing material completely filling the said volume, and
d. electrical leads from the element to the exterior of the housing.

4,027,537
APPARATUS FOR SAMPLING A STREAM OF FIBERS AND THE LIKE

Donald W. Van Doorn, Columbus, and Donald R. Lloyd, Midland, both of Ga., assignors to Lummus Industries, Inc., Columbus, Ga.

Filed June 21, 1976, Ser. No. 698,108
Int. Cl.² G01N 1/04
U.S. Cl. 73—421 R **22 Claims**



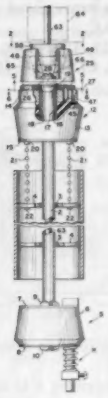
1. In apparatus adapted to sample fiber-like material while in an airborne stream,
   a. a sample collecting chamber,
   b. said chamber having at least one wall pervious to air and substantially impervious to the material to be collected,
   c. means to admit the airborne material to the chamber comprising a movable wall section of the collecting chamber disposed in one position to direct the airborne stream into the chamber and in another position to close the chamber, whereby the airborne stream may be selectively passed into or caused to by-pass the collecting chamber.
   d. a reciprocating platen in the chamber, and
   e. means to remove the material from the apparatus as a compacted sample.

4,027,538
LATCH RELEASING MECHANISM FOR WATER SAMPLERS

Robert P. Snyder, Bay City, and Edmund P. Deja, Saginaw, both of Mich., assignors to Trippensee Corporation, Saginaw, Mich.

Filed Feb. 9, 1976, Ser. No. 656,535
Int. Cl.² G01N 1/10
U.S. Cl. 73—425.4 R **18 Claims**

1. Latch releasing mechanism for a water sampler or the like having a latch member movable between latched and unlatched positions, said mechanism comprising a pair of clasp members; means mounting said clasp members for movements in directions into and out of latching position; motion transmitting means carried by each of said clasp members for effecting movement of the latter, said motion transmitting means being spaced apart to form a chamber therebetween; operating means; and means supporting said operating means in said chamber for movement along a path transverse to the directions of movement of said clasp members, said motion transmitting means and said operating means being so configured that movement in one direction along said path of

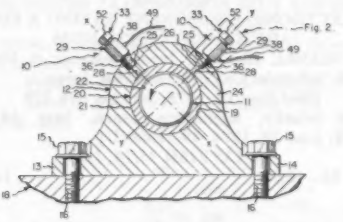


said operating means effects movement of said clasp members from said latched position toward said unlatched position.

4,027,539
APPARATUS FOR, AND METHOD OF, MEASURING DYNAMIC FORCES

John D. Halloran, 208 Chasewood Lane, East Amherst, N.Y. 14051

Filed Apr. 9, 1976, Ser. No. 675,589
Int. Cl.² G01M 1/22
U.S. Cl. 73—465 **8 Claims**

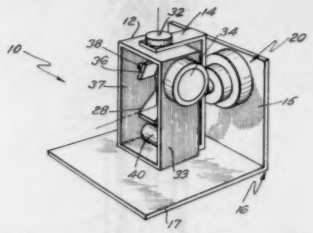


1. The method of measuring the amplitude and frequency of a component of dynamic force exerted by a rotating member on an adjacent bearing shell in a first direction, said bearing shell being mounted within a non-rotating member, comprising the following steps:
   sensing between said bearing shell and non-rotating member the frequency and a proportional amount of the amplitude of such force component exerted by said rotating member on said bearing shell at only one point in said first direction;
   converting such sensed frequency and amplitude in said first direction into a first electrical signal; and
   adjusting said first electrical signal to calibrate the sensed value of amplitude to its actual value;
   thereby to produce an adjusted first electrical signal representing the actual values of frequency and amplitude of said force component in said first direction.

4,027,540
INERTIAL OPTICAL STABILIZER

Frederick C. Allard, Mystic, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 21, 1975, Ser. No. 561,017
Int. Cl.² G01C 19/24
U.S. Cl. 74—5.1 2 Claims

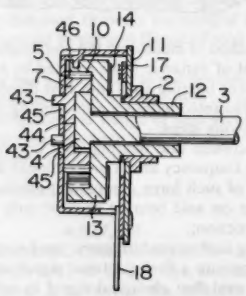


1. A line-of-sight stabilization system comprising:
a platform;
an outer gimbal comprising a U-shaped element with said element rotatably connected at a point equidistant from its ends to said platform;
an inner gimbal rotatably connected to said outer gimbal, said inner gimbal having a first wall connected to said outer gimbal, a second wall parallel to and spaced from said first wall, said second wall being connected to said outer gimbal, a third wall connected to said first and second walls, and a fourth wall containing an aperture, said fourth wall being spaced from and parallel to said third wall, said fourth wall connected to said first and second walls;
a first mirror fixedly connected to said outer gimbal so as to rotate with said outer gimbal, said first mirror being connected at an angle of substantially 45° with the inner gimbal axis;
a second mirror fixedly connected to said third wall of said inner gimbal so as to rotate with said inner gimbal, said second mirror being connected at an angle of substantially 45° with the outer gimbal axis; and
a rotor connected to said inner gimbal for stabilizing each of said inner and outer gimbals in a fixed direction.

4,027,541
ELECTRONIC COMPONENT HAVING A FINE ADJUSTMENT MECHANISM

Matsuo Nishioka, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed May 12, 1975, Ser. No. 576,379
Claims priority, application Japan, May 14, 1974, 49-54238; June 28, 1974, 49-76880[U]
Int. Cl.² F16H 35/18, 1/28
U.S. Cl. 74—10.54 14 Claims

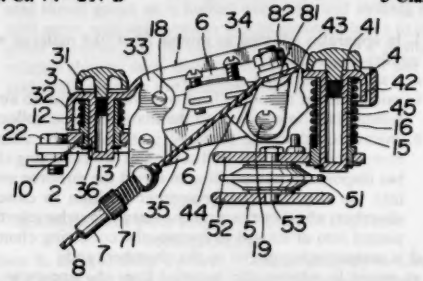


1. An electronic component having a fine adjustment mechanism comprising
a case including a side wall having a plurality of bores therein,
a drive shaft having an eccentric cam formed on a portion thereof, said drive shaft extending from said case,
a ring-shaped intermediate reduction member having a plurality of projections and a gear portion formed on the outer periphery thereof coupled to the eccentric cam on said drive shaft said plurality of projections fitting loosely into the plurality of bores in said casing thereby preventing rotation of said intermediate reduction member while permitting eccentric movement thereof,
a reduction rotating member having a gear portion formed on the inner periphery thereof coupled to a portion of the gear portion of said intermediate reduction member, the gear portion on said reduction rotating member having a diameter different from that of said intermediate reduction member, and,
an actuating member coupled to said reduction rotating member.

4,027,542
DERAILLEUR FOR BICYCLE

Masashi Nagano, Sakai, Japan, assignor to Shimano Industrial Company, Limited, Osaka, Japan

Filed Sept. 23, 1975, Ser. No. 615,920
Claims priority, application Japan, Oct. 4, 1974, 49-114983; Oct. 4, 1974, 49-114984; Oct. 4, 1974, 49-114985; Oct. 4, 1974, 49-114986
Int. Cl.² F16H 7/22
U.S. Cl. 74—217 B 5 Claims



1. A derailleur for a bicycle having a frame member, said derailleur comprising:
a bracket fixed to the frame member of the bicycle,
a support mounted to said bracket and rotatable relative thereto through a given range,
two parallel links, one end of each of said links being pivotally connected to said support,
a movable member pivotally connected to the other end of each of said links,
a chain change-over frame having two chain-guide sprocket wheels,
said frame being mounted to said movable member and rotatable relative thereto through a given range,
said bracket having a base and a forked end,
mounting means connected to the base for rotatably carrying said support thereon,
said support and said movable member each comprising a front wall parallel to said bracket, a side wall extending toward said bracket adjacent to said front wall, and mounting walls opposite to each other and extending adjacent to said side wall,
a first tubular member integral with and extending from a central portion of said front wall of the support said first tubular member being rotatably sleeved to said mounting means connected to the base of said bracket to thereby rotatably support said support,
said chain change-over frame comprising two guide plates rotatably carrying two chain-guide sprocket wheels therewith, one of said two guide plates having mounting means for being rotatably supported on said movable member, and
a second tubular member integral with said front wall of the

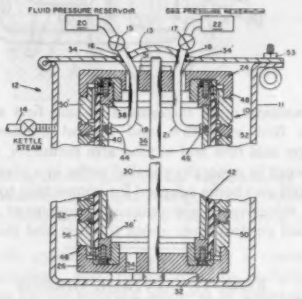
movable member and extending from said front wall of the movable member toward said one of said guide plates, said second tubular member being rotatably sleeved to said mounting means of said one of said guide plates so that said guide plates may be rotatably supported on said movable member.

4,027,543

METHOD FOR CURING ELASTOMERIC ARTICLES

Jonathan A. Johnston, Denver, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed Oct. 17, 1974, Ser. No. 515,759
Int. Cl.² B29H *5/01, 7/22*
U.S. Cl. 74—231 R **16 Claims**



1. A method for curing reinforced vulcanizable elastomeric power transmission belting disposed between a mold surface and a pressure chamber, comprising the steps of:

delivering into the chamber a hot fluid of relatively high heat capacity and pressurizing the fluid to a first pressure;

maintaining the fluid in the chamber at the first pressure for a residence period sufficient to at least partially soften the elastomeric belting but insufficient to significantly vulcanize the elastomeric belting;

while the elastomeric belting is in a softened state delivering into the chamber in admixture with the fluid a gas of low heat capacity relative to the hot fluid;

pressurizing the gas and fluid in the chamber to a second pressure from about 300 to about 520 psi thereby causing the elastomeric belting to flow into conformance with the mold surface; and thereafter

vulcanizing the elastomer belting by heating said mold surface.

4,027,544

V-BELT VARIABLE-SPEED DRIVE

Takashi Kobayashi, Hamamatsu, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Japan

Filed Apr. 23, 1976, Ser. No. 679,746
Claims priority, application Japan, June 19, 1975, 50-82668[U]
Int. Cl.² F16L *55/52*
U.S. Cl. 74—230.17 E **7 Claims**

1. A V-belt variable-speed drive comprising:

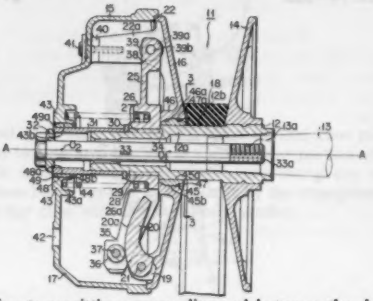
a driving shaft;

a stationary sheave concentrically fixed to said driving shaft;

sliding sheave means having a sliding sheave facing the stationary sheave and supported by at least two central portions penetrated by the driving shaft, said central portions having a spherical inner surface;

at least two bearings mounted on the driving shaft and being slideable axially thereof, each of the bearings having a cylindrical inner surface which contacts the outer surface of the driving shaft and each of the bearings having a spherical outer surface shaped complementary to the inner surfaces of said central portions of the sliding sheave means, the complementary spherical outer surface of the respective bearings being concentered as the spherical surfaces of said central portions of the sliding sheave means, and said bearings being inserted into the corresponding central portions of the sliding sheave means with the sperical outer surface of said bearings being contacted by the spherical inner surface of the corresponding central portions;

an endless belt passing between the stationary sheave and the sliding sheave;



rotation-transmitting means disposed between the driving shaft and the sliding sheave means to transmit the rotation of the driving shaft to the siding sheave;

displacing means disposed between the driving shaft rotation-transmitting means and the sliding sheave means to draw the sliding sheave nearer to the stationary sheave as the driving shaft is rotated at a more accelerated speed; and

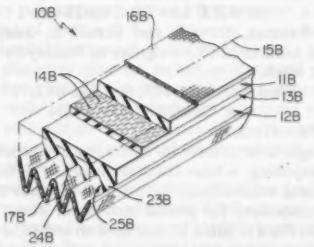
urging means for urging the sliding sheave in the direction in which the sliding sheave is separated from the stationary sheave.

4,027,545

ENDLESS POWER TRANSMISSION BELT AND METHOD OF MAKING SAME

Jack D. White, Jr., Springfield, Mo., assignor to Dayco Corporation, Dayton, Ohio

Filed Mar. 19, 1976, Ser. No. 668,544
Int. Cl.² F16G *5/16, 1/00;* **B29H** *7/22*
U.S. Cl. 74—233 **12 Claims**



1. An endless power transmission belt for operation in an endless path comprising, a tension section, a compression section, and a load-carrying section, said load-carrying section being a flat strip of rubber bonded between said tension and compression sections and having a plurality of elongated discrete fibers embedded therein, said compression section comprising a fiber-loaded platform layer providing transverse rigidity for said belt.

4,027,546

SPEED CHANGING DEVICE FOR TOOLS HAVING A GEAR ASSEMBLY WITH A VARIABLE GEAR RATIO

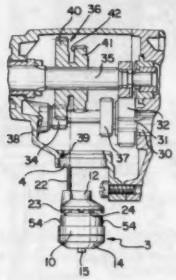
Lorenzo Ercole Alessio, Cairoli, Italy, assignor to The Black and Decker Manufacturing Company, Towson, Md.

Filed June 2, 1976, Ser. No. 692,212

Claims priority, application Italy, June 12, 1975, 24324/75; June 12, 1975, 21672/75

Int. Cl.² F16H *1/12, 3/08;* **B60K** *20/10*

U.S. Cl. 74—325 **27 Claims**



1. In a tool having an output shaft, a gear-box housing having an opening formed therein, a gear assembly disposed in the gear-box housing and having gear means movable between at least two positions for changing the gear ratio of the gear assembly, a motor for driving the output shaft through the gear assembly, and a device for moving the gear means to change the gear ratio, the device comprising:

an annular guide member fixedly mounted to the gear-box housing in said opening thereof;

a cylindrical member rotatably mounted in said annular guide member, said cylindrical member having one end extending outside of the gear-box housing to facilitate manually moving said cylindrical member relative to said guide member;

eccentric means arranged at the other end of said cylindrical member for engaging the gear means to move the same from one of said positions to the other one of said positions in response to the manual actuation of said cylinder member;

seal means formed on said cylindrical member and said annular guide member for sealing the gear-box housing with respect to the ambient; and,

resilient means for applying resilient pressure to said seal means whereby an effective seal between said members is established to prevent lubricating liquid from flowing out between said members from the gear-box housing.

4,027,547

SINGLE LEVER CONTROL

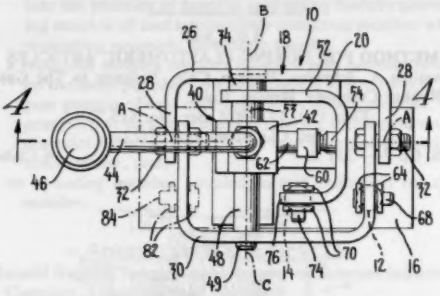
Habibur Rahman, Detroit, and Gerald L. Joslyn, Auburn Heights, both of Mich., assignors to Massey-Ferguson Inc., Detroit, Mich.

Filed Dec. 17, 1975, Ser. No. 641,707

Int. Cl.³ G05G *9/00, 9/04*

U.S. Cl. 74—471 XY **11 Claims**

1. A single lever control for operating two separate mechanisms comprising; a base structure adapted to be supported adjacent said mechanisms, a first arm member mounted on said base structure for pivotal movement about a first axis disposed in fixed relation to said base structure, a second arm member mounted on said base structure for pivotal movement about a second axis disposed in fixed relation to said base structure and intersecting said first axis, a shaft forming a third member having one end supported at the intersection of the first and second axes and the other end supported on said first arm member for rotational movement about a third axis, a control lever rigidly connected to said shaft member for rotational movement of the latter on the third axis and for angular displacement of said shaft member about the first axis during movement of said control lever from a neutral position in which said first, second and third members are disposed in a common plane, means connecting said control lever to said second arm member to move the latter to selected positions about the second axis upon movement of said control lever about the third axis, said second arm member remaining in its



selected position upon movement of said first arm member about the first axis, first and second connecting means mounted on said first and second arm members, respectively, for movement in generally parallel paths in a plane parallel to said first axis and being adapted for connection to said mechanisms for selective or simultaneous movement upon movement of said control lever about the first and third axes.

4,027,548

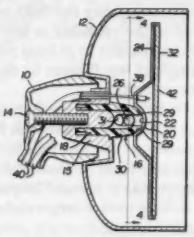
REMOTE CONTROL MIRROR

James M. Cummins, Warren, Mich., assignor to Mirrex, Incorporated, Warren, Mich.

Filed May 1, 1975, Ser. No. 573,685

Int. Cl.² G01P *3/20*

U.S. Cl. 74—501 M **27 Claims**



1. In a remotely controlled mirror system of the type including a mirror anchored to a mirror backing plate whose position is adjustable relative to a mirror housing by means of a cable linkage interconnecting the mirror backing plate with a control unit, the improved means for mounting the mirror backing plate to the mirror housing, comprising:

a joint comprising a semi-spherical head on a first element and a semi-spherical head-receiving socket on a second element, one of said cooperating head and socket elements forming a part of the housing, and the other of said cooperating elements forming a part of the mirror backing plate, said elements being held in abutting but relatively pivotal contact by the tension of the cable linkage exerting a force pulling the mirror backing plate toward and against the cooperating element of the housing;

a slot traversing said semi-spherical head of said first element and opening towards said head-receiving socket of said second element;

and a stabilizing pin secured to the one of said backing plate and housing of which said socket element forms a part, said stabilizing pin being received in said slot;

said pin and slot being so oriented that rotation of the mirror about a first axis substantially parallel to the cable linkage at its attachment point to the mirror backing plate is restricted by the resultant interference between said pin and the side surfaces of said slot, while leaving the mirror

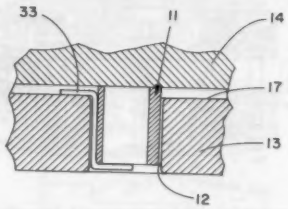
free to rotate about a second axis mutually perpendicular to said first axis.

4,027,549

PLUG-TYPE COUNTERWEIGHT AND LOCK

Vincent Colletti, Rocky Hill, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 16, 1975, Ser. No. 623,139
Int. Cl.² F16F 15/22
U.S. Cl. 74—573 R **10 Claims**



1. A balancing device adapted for rapid change of weight within a constant outer weight configuration comprising:
- a rotatable body adapted to be balanced by a cylindrical weight,
- a generally cylindrical weight having a constant outer configuration and replaceable by substitution of weights having selected amounts of internal mass removed,
- a hole in said body formed to accommodate said weight and an elongate locking strip for holding said weight in place in said hole,
- said locking strip foldable at least 90° at selected transverse positions and adapted when folded to support said weight at one end,
- said body having a recess for receiving one end portion of said locking strip,
- said one end portion folded at an angle of substantially 90° to the remainder of said locking strip,
- said weight having an outer longitudinally extending recess for receiving an intermediate portion of said locking strip,
- said weight shorter in length than the depth of said hole and said locking strip folded at its end remote from said one end at an opposite angle to the fold of said one end for supporting said weight,
- whereby said weight may be applied by folding said strip at said one end, inserting the strip in said recess in said rotatable body, inserting said weight in said hole with said intermediate strip portion in said longitudinal recess, and folding said other end of said strip across the exposed surface of said weight.

4,027,550

RATCHET CLAW

Jusuke Yaguinuma, Tokyo, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed June 2, 1976, Ser. No. 692,238
Claims priority, application Japan, June 5, 1975, 50-75300[U]
Int. Cl.² F16D 41/12
U.S. Cl. 74—577 S **2 Claims**

1. Construction of a ratchet claw adapted to be resiliently urged against ratchet teeth formed on an annular portion of a rotatable member supported by a shaft on a stationary member for rotation relative thereto, the improvement wherein said ratchet claw is pivotally supported on a stationary member at its proximal end while its free distal claw portion is adapted to be engaged with said ratchet teeth and said ratchet claw is formed with a resilient ratchet biasing arm extending from a portion of said ratchet claw adjacent to said proximal end toward said free distal claw portion with a distance held therebetween, said ratchet biasing arm being so arranged relative to said free distal claw portion that said annular portion of said rotatable member is resiliently clamped between said free distal claw portion and said ratchet biasing arm so as

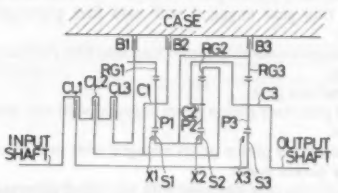
to cancel each other the biasing forces of said claw portion and said biasing arm applied to said annular portion of said rotatable member thereby positively preventing any radial force from being applied to said shaft by the engagement of said ratchet claw with said rotatable member.

4,027,551

SPEED CHANGE GEAR SYSTEM

Noboru Murakami, Nagoya; Koichiro Hirosawa, Kariya; Kazuo Ohara, and Koichi Matsuo, both of Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed May 27, 1975, Ser. No. 580,790
Claims priority, application Japan, June 27, 1974, 49-74137
Int. Cl.² F16H 57/10
U.S. Cl. 74—759 **10 Claims**



1. A speed change gear system comprising:
- a casing;
- an input shaft;
- an output shaft;
- a first planetary gear set including a first sun gear, a first planetary gear engaged with said first sun gear, a first ring gear meshed with said first planetary gear, and a first carrier rotatably supporting said first planetary gear;
- a second planetary gear set including a second sun gear connected to said first sun gear, a second planetary gear meshed with said second sun gear, a second ring gear meshed with said second planetary gear and connected to said first carrier, and a second carrier rotatably supporting said second planetary gear;
- a third planetary gear set including a third sun gear; a third planetary gear meshed with said third sun gear, a third ring gear meshed with said third planetary gear and connected to said first and second sun gears, and a third carrier rotatably supporting said third planetary gear and connected to said second carrier and said output shaft;
- a first clutch for engaging or disengaging said input shaft and said third sun gear;
- a second clutch for engaging or disengaging said input shaft and said first carrier and said second ring gear;
- a third clutch for engaging or disengaging said input shaft and said first ring gear;

a first brake for fixedly mounting said first carrier and said second ring gear on said casing; and

a second brake for fixedly mounting said first and second sun gears and said third ring gear on said casing.

4,027,552

SPEED CHANGE GEAR SYSTEM

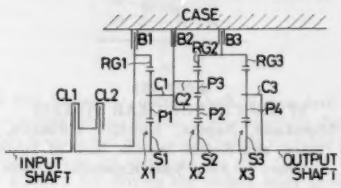
Noboru Murakami, Nagoya; Koichiro Hirosawa, Kariya; Kazuo Ohara, and Koichi Matsuo, both of Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Apr. 22, 1975, Ser. No. 571,019

Claims priority, application Japan, May 7, 1974, 49-50594

Int. Cl.² F16H *57/10*

U.S. Cl. 74—765 **5 Claims**



1. A speed change gear system comprising:

an input shaft;

a first sun gear;

first planetary pinion gears engaged with said first sun gear;

a first ring gear engaged with said first planetary pinion gear;

a first carrier rotatably supporting said first planetary pinion gears;

a second sun gear;

second planetary pinion gears engaged with said second sun gears;

third planetary pinion gears engaged with said second planetary pinion gears;

a second ring gear engaged with said third planetary pinion gears;

a second carrier rotatably supporting said second and third planetary pinion gears;

said second carrier being drivingly connected with said first carrier;

a third ring gear drivingly connected with said second ring gear;

fourth planetary pinion gears engaged with said third ring gear;

a third sun gear engaged with said fourth planetary pinion gears and being drivingly connected with said second sun gear;

a third carrier rotatably supporting said fourth planetary pinion gears;

a first clutch for simultaneously coupling or uncoupling said first, second, and third sun gears to or from said input shaft;

a second clutch for coupling or uncoupling said first ring gear to or from said input shaft;

an output shaft dynamically and intergrally connected to said third carrier;

a first brake means capable of being actuated for locking said first ring gear to said transmission case, a second brake means capable of being actuated for simultaneously locking said first and second carriers to said case, and a third brake means capable of being actuated for simultaneously locking said second and third ring gears to said case.

4,027,553

ANGLE GEAR DRIVE ARRANGEMENT

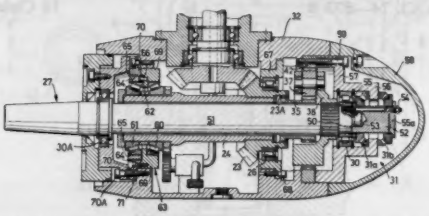
Johann Eichinger, Putzbrunn, and Wilhelm Schwibach, Munich, both of Germany, assignors to Carl Hurth Maschinen- und Zahnradfabrik, Munich, Germany

Filed June 4, 1976, Ser. No. 692,865

Claims priority, application Germany, July 25, 1975, 2533305; July 25, 1975, 2533306

Int. Cl.² F16H *1/28, 1/14, 1/20*

U.S. Cl. 74—801 **4 Claims**



1. In an angle gear drive arrangement, in particular for high performances, for example for a steerable propeller or the like for watercraft, in which a driven shaft is supported in a gear housing and can be driven through a bevel-gear pair, the improvement comprising the driven bevel gear of the bevel gear-pair is arranged on a hollow shaft, which is supported independently from the driven shaft and encircling same and is coupled with the driven shaft, and wherein the hollow shaft is supported at one end with two head-on arranged combined radial-axial-bearings, for example two tapered-roller bearings, of which the one is installed in such a manner that it absorbs both radial and also axial forces, while the other bearing is mounted with radial play, so that is absorbs only axial forces.

4,027,554

ELECTRONIC CONTROL APPARATUS OF AN AUTOMATIC SPEED CHANGING APPARATUS

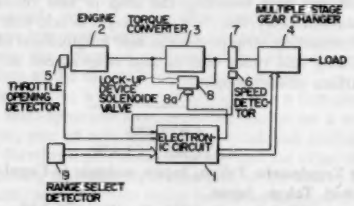
Terukazu Ito, Isehara; Kiyoharu Nakao, Hiratsuka; Teruo Minami, Yokohama, and Masaru Uenoyama, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed July 24, 1974, Ser. No. 491,359

Claims priority, application Japan, July 30, 1973, 48-85698

Int. Cl.² B60K *41/18*

U.S. Cl. 74—866 **8 Claims**



1. In an electronic control apparatus of an automatic speed changing apparatus for use in an internal combustion engine of the type wherein said engine is connected with a load through a fluid type torque converter and a multiple stage gear changer, the improvement with comprises means for locking-up said torque converter when the speed of the output shaft of said torque converter exceeds a first predetermined speed, means for shifting up said gear changer to a higher stage when the spaced of said outut shaft of said torque converter exceeds a second predetermined speed which is higher than said first predetermined speed, and means for shifting down said gear changer to a lower stage when the speed of said output shaft

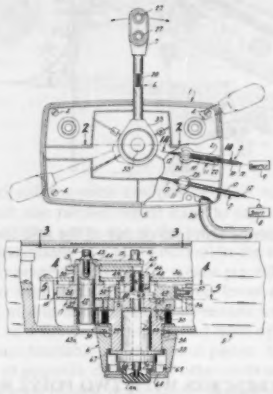
of said torque converter decreases below a third predetermined speed which is lower than said first predetermined speed.

4,027,555

ENGINE TRANSMISSION AND SPEED CONTROL WITH WARM-UP INTERLOCK APPARATUS

Roy J. Rauchle, and John L. Vandenberg, both of Oshkosh, Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed July 12, 1974, Ser. No. 488,028
Int. Cl.² B60K *41/04*
U.S. Cl. 74—878 **23 Claims**



1. In a drive control apparatus for an engine driven marine propulsion unit having a speed control means and directional drive control means, a supporting enclosure, a speed setting means, a directional drive setting means, a movable selection input means, a direction coupling means between said input means and said setting means and having a first coupling position to transmit the position of the input means to the directional drive setting means and a second lost motion coupling position transmitting the motion of the input means to the directional drive setting means only after a selected movement of the input means, and a warm-up control means coupled to the direction coupling means and having interlock means moved by said warm-up control means into immobilizing engagement with said directional drive setting means to restrict the movement thereof in response to movement of said direction coupling means to establish said second coupling position.

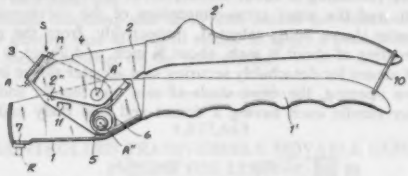
4,027,556

MANUAL BLIND RIVETING TOOL

Gunther Klein, and Karl Spohr, both of Walldorf, Hessen, Germany, assignors to GESIPA Blindniettechnik Gesellschaft mit beschrankter Haftung, Frankfurt am Main, Germany

Filed Oct. 15, 1975, Ser. No. 622,499
Claims priority, application Germany, Oct. 7, 1975, 7531806[U]
Int. Cl.² B21J *15/34*
U.S. Cl. 81—3 R **8 Claims**

1. A blind riveting tool comprising:
an elongated holding member having a rearwardly extending handle and a front end;
an elongated displaceable member pivoted at said front end and having a rearwardly extending handle displaceable toward and away from said handle of said holding member and a forwardly directed jaw; and
a clamping element pivoted on said displaceable member adjacent said jaw and formed with a seat adjacent and turned toward said jaw, whereby a blind-rivet mandrel can be clamped between said jaw and said seat and displaced relative to said front end on pivoting of said handles relative to each other, said holding member being formed with a hole dimensioned to receive a blind rivet mandrel and alignable with said seat, the pivot for said element on said holding member lying between the pivot



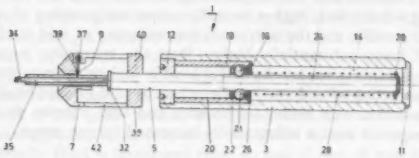
of said displaceable member on said clamping element and said hole, said clamping element being generally U-shaped and has a pair of elongated sides flanking said jaw and a bight interconnecting said sides and forming said seat, said pivots being formed on the free ends of said sides.

4,027,557

STRIPPING DEVICE FOR WIRE, OR THE LIKE

Jiri Stepan, Stafa, Switzerland, assignor to K. Loepfe Automation AG, Hombrechtikon, Switzerland

Filed Sept. 2, 1976, Ser. No. 720,092
Claims priority, application Switzerland, Apr. 26, 1976, 5196/76
Int. Cl.² H02G *1/12*
U.S. Cl. 81—9.5 R **13 Claims**



1. A stripping device for stripping insulating from wire, or the like purposes, said device comprising:
a spindle housing; a spindle rotatable in and longitudinally movable through said housing;
a stripping head secured to said spindle for moving therewith; a passage into said head for receiving the wire, or the like, to be stripped;
a knife in said head positionable to intersect said passage, thereby to engage and cut any object in said passage;
spindle support means in said housing for causing rotation of said spindle as it is moved longitudinally of said housing, thereby to rotate said spindle and said knife with respect to the wire, or the like, being stripped.

4,027,558

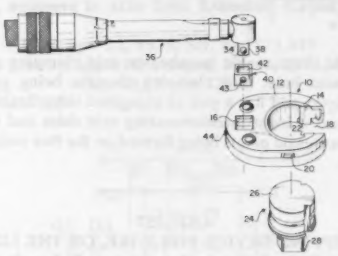
RATCHET-TYPE TORQUE WRENCHES WITH EXTENDED TORQUE RANGE

Herbert L. Fish, 6525 Kerns Road, Falls Church, Va. 22044

Filed June 18, 1975, Ser. No. 587,899
Int. Cl.² B25D *23/142*
U.S. Cl. 81—52.4 R **1 Claim**

1. A torque wrench assembly comprising a ratchet head and a pair of torque wrench handles adapted to drive said head, said head including a substantially flat elongated body with a ratchet wheel rotatably mounted adjacent to one end of the body and with a square drive opening adjacent to the opposite end of the body, said ratchet wheel having means for engaging and turning a member to be driven, one of said handles having

a square drive stud fitting said drive opening the other of said handles having a square drive stud substantially smaller than said drive opening, an adapter sleeve having outer cross-dimensions fitting said drive opening and having inner cross-dimensions fitting the drive stud of said other handle, the cross-dimensions of said drive opening being selected from the group consisting of about ⅜ inch, about ½ inch, and about ¾ inch, and the inner cross-dimensions of the corresponding adapter sleeve being selected, respectively, from the group consisting of about ¼ inch, about ⅜ inch, and about ½ inch, and means for detachably securing said adapter sleeve in said drive opening, the drive studs of said one handle and said other handle each having a detent and said body and said



adapter sleeve each having a recess for receiving the detents of said drive studs, respectively, whereby said handles may be releasably coupled to said body and to said adapter sleeve, respectively, said drive opening extending comletely through said body so that said drive studs may be inserted into said drive opening and said adapter sleeve, respectively, from either end thereof, the torque range rating of said one handle being substantially higher than the torque range rating of said other handle, and the maximum torque rating of said ratchet head being substantially higher than the maximum torque rating of said other handle and at least as high as the maximum torque rating of said one handle, whereby said ratches head in conjunction with both said handles and said adapter sleeve can operate over a substantially increased torque range.

4,027,559

DEVICE FOR ACTUATING SCREW-THREADED BOLTS

Günter Wallrafen, Erkelenz-Kuckhoven, Germany, assignor to Maschinen- und Bohrgerate-Fabrik Alfred Wirth & Co., K.G., Erkelenz, Germany

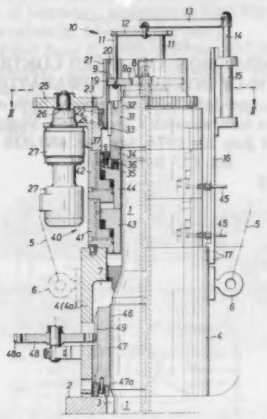
Filed Aug. 27, 1975, Ser. No. 608,254

Claims priority, application Germany, Sept. 6, 1974, 2442798

Int. Cl.² B25B *29/02*

U.S. Cl. 81—57.38 **14 Claims**

1. Device for tensioning screw bolts, which can be screwed into a receptor screw threading and on to which fastening nuts can be screwed to form screw connections on flanges, lids, closures and the like, especially in pressure vessels, reactor vessels or the like, the device including a support member the bottom end of which can be placed on a base, said support member having at least one opening for receiving at least one screw bolt end and having at least one cylinder with a piston slidable within the latter, which piston is adapted to act on an abutment nut, the device being further provided with motor means for rotating the said abutment nut, so as to screw or unscrew the latter on to or from the screw bolt, wherein the said motor means for rotating the abutment nut serves further as a motor drive for a spanner element provided on the support member or on a part associated therewith, said spanner element being movable to be brought into and out of torque-transmitting connec[illegible]aner flats of the screw bolt and being adapted to [illegible]d by said motor means for



screwing the screw bolt into or out of the said receptor screw threading.

4,027,560

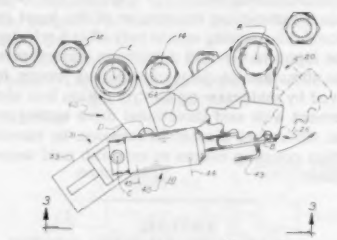
POWER WRENCHES WITH TWO POINT REACTION MEANS

Kenneth Wade Parker, Houston, Tex., assignor to N-S-W Corporation, Houston, Tex.

Continuation of Ser. No. 506,915, Sept. 17, 1974, abandoned. This application Sept. 15, 1975, Ser. No. 613,394

Int. Cl.² B25B *13/46*

U.S. Cl. 81—57.39 **6 Claims**



1. A power tool for rotating one of a plurality of threaded members, said tool comprising:

a. a wrench positionable over one threaded member for transmitting a torque thereto, said wrench having a head;

b. a beam having a hollow sleeve loosely receiving said wrench therethrough for free relative rotation therebetween in the clockwise and counter-clockwise directions;

c. a fluid-operated cylinder mounted over and being pivotally coupled to said beam, said cylinder having a reciprocating rod coupled to said head for transmitting a force thereto;

d. an anchor anchorable only over another threaded member;

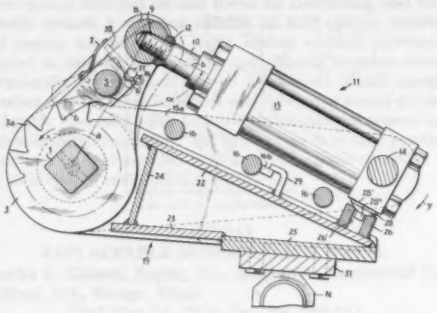
e. means coupling said anchor to said beam; and

f. said tool being anchorable solely to said one and said another threaded members for transmitting a torque to said one threaded member in both clockwise and counterclockwise directions, depending on the direction of the power stroke exerted by said rod.

4,027,561
HYDRAULIC WRENCH

John K. Junkers, 7 Arrowhead Lane, Saddle River, N.J. 07458

Filed Nov. 19, 1975, Ser. No. 633,249
Int. Cl.² B25B *13/46*
U.S. Cl. 81—57.39 13 Claims

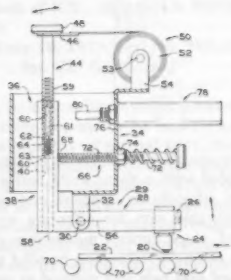


1. A hydraulic wrench comprising shaft means having an axis; at least one ratchet wheel fixed to said shaft means for rotation with the same about the axis thereof; frame means located substantially in a plane normal to the axis of said shaft means and comprising first lever means pivotally connected at one end to said shaft means, second lever means pivotally connected at one end to said shaft means and including an angle with said first lever means, and fluid operated expandable and contractable cylinder-and-piston means pivotally connected at opposite ends to the other ends of said first lever and second lever means, respectively; at least one ratchet pawl pivotally carried out by said first lever means intermediate the ends of the latter and engaging the teeth of said ratchet wheel for turning the ratchet wheel and the shaft means connected thereto; exchangeable socket means mounted at one end of said shaft means for engaging a polygonal head of a threaded connector for turning the latter, whereby during such turning of the threaded connector in one direction a force is created tending to turn said frame means about the axis of said shaft means in the opposite direction; and means pivotally attached at one end to said shaft means and in the region of the other end operatively connected to said frame means and adapted to engage a fixed abutment adjacent to the threaded connector to be turned for counteracting said force.

4,027,562
FORCE APPLYING DEVICE FOR SCORING WHEELS

Robert M. Bonaddio, Monroeville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 23, 1976, Ser. No. 669,560
Int. Cl.² B26D *3/08*
U.S. Cl. 83—8 23 Claims

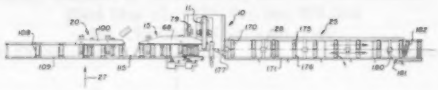


1. A device for applying a force to a tool means comprising:
lever arm means having an end;
means for mounting the tool means adjacent an end of said lever arm means;
means for pivotally mounting said lever arm means to move the tool means through an oscillatory path;
force applying means secured to said lever arm means to bias the tool means in a first direction along the oscillatory path; and
means mounting said lever arm means for dimensionally altering said lever arm means to apply a predetermined resultant force on the tool means.

4,027,563
CONTROLLED TRANSVERSELY MOVABLE GUIDE MEANS FOR LUMBER

Jack Weavell, Coquitlam, Canada, assignor to CAE Machinery Ltd., Vancouver, Canada

Filed June 1, 1976, Ser. No. 691,308
Int. Cl.² B27B *27/02, 27/10*
U.S. Cl. 83—106 7 Claims

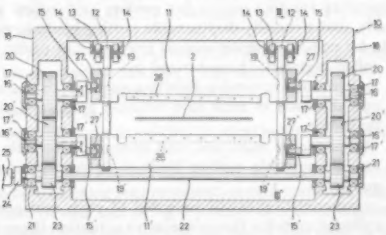


1. Apparatus for longitudinally sawing lengths of wood, comprising supporting means for supporting lengths of wood in a path of travel in which a saw is located, means for moving the wood lengths along the path to be cut longitudinally by the saw, relatively long guide means extending along and parallel with the path and mounted for movement transversely of said path and being selectively movable back and forth across the path by setworks connected thereto, a closed hydraulic system comprising a plurality of piston-cylinder units with a unit near each of opposite ends of the guide means, one end of each cylinder unit being fixed against movement and the opposite end of said each cylinder unit being connected to the adjacent end of the guide means, and pipe means so interconnecting said cylinder units that when the guide means is moved, hydraulic fluid is transfered from an end of one of said units to an opposite end of another of said units to ensure the ends of the guide means moving in unison exactly the same distance.

4,027,564
MACHINE FOR CUTTING A MOVING STRIP OF MATERIAL

Satoshi Yahara, Daito, Japan, assignor to Kabushiki Kaisha Token Kikai Seisakusho, Daito, Japan

Filed June 23, 1976, Ser. No. 699,052
Int. Cl.² B23D *25/02*
U.S. Cl. 83—328 2 Claims



1. A machine for cutting a moving strip of material into regular sizes by intermittently rotating two cutting blades at a speed synchronized with the speed at which the material to be

cut is being fed, said machine comprising: a frame constructed for the material to be cut to pass through the center thereof,

two opposed pairs of driving shafts laterally mounted through the side walls of said frame, one pair above the other,

two opposed pairs of eccentric shafts eccentrically coupled to said driving shafts,

an opposed pair of cutting blade holders each laterally supported by said pair of eccentric shafts at the opposite ends thereof so as to impart a substantially circular motion to said cutting blades as said driving shafts rotate,

an opposed pair of cutting blades each fixedly mounted on said cutting blade holders with their cutting edges facing each other,

means for driving said two pairs of driving shafts at the same time but in opposite directions, and

a pair of vertical guide suspended from the top wall of said frame for longitudinal movement and loosely fitted in two vertical through holes formed in said cutting blade holders in alignment with said eccentric shafts, whereby putting said cutting blades into cutting engagement with the material at the same time and at the same cutting angle.

4,027,565

REVOLVING SHEARS FOR HIGH SPEED SEVERING

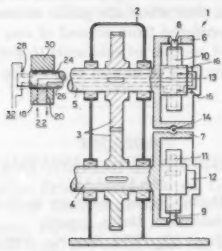
Wolfgang Elsner, Ratingen; Jorn Moslener, Angermund, and Alfons Langenstuck, Duisburg, all of Germany, assignors to Demag Aktiengesellschaft, Duisburg, Germany

Filed Nov. 21, 1975, Ser. No. 634,165

Claims priority, application Germany, Nov. 29, 1974, 2456431

Int. Cl.² B26D *3/22*

U.S. Cl. 83—337 **3 Claims**



1. A shearing device for cutting rolled material, such as wire moving at high linear speeds into lengths comprising a pair of cooperating rotating guides for guiding said rolled material linearly, and a radially displaceable cutting blade in each said guide for cooperating movement into and out of the path of said rolled material, characterized by

a. an hydraulic reversible fluid pressure piston and cylinder unit disposed in each said rotating guide and rotatable therewith;

b. the piston of each said unit connected directly to said radially movable cutting blade in its respective rotating guide;

c. servo-control means connected to each said piston and cylinder units for the cooperative actuation thereof to cut said rolled material into lengths; and

d. said servo-control means for each said reversible piston and cylinder unit is mounted on said rotating guides adjacent their respective reversible unit.

4,027,566

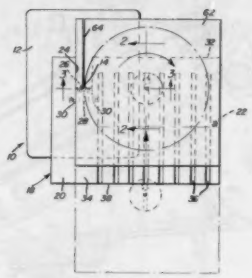
CIRCLE CUTTING ATTACHMENT FOR BAND SAW

Thomas D. Harrill, Rte. 1, Mabank, Tex. 75147

Filed May 13, 1976, Ser. No. 686,672

Int. Cl.² B27B *13/04*

U.S. Cl. 83—411 R **7 Claims**



1. In combination with a cutting tool including a cutting element toward which a workpiece may be advanced along a predetermined path for cutting of said workpiece by said element, a base including a plurality of side by side parallel guides paralleling said path, a follower selectively removably engageable with any one of said guides for predetermined lateral adjustment of said follower relative to said path and guided movement of said follower along the selected guide in parallel relation relative to said path, a workpiece support rotatably supported from said follower for angular displacement about an axis substantially normal to a plane containing a pair of said guides, and support means supporting said base relative to said tool with said guides at least substantially paralleling said path.

4,027,567

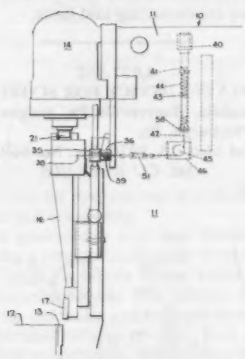
RAKE ANGLE CONTROL FOR SHEARS AND THE LIKE

Clarence O. Jones, Jr., Eggertsville, N.Y., assignor to Niagara Machine & Tool Works, Buffalo, N.Y.

Filed Oct. 4, 1976, Ser. No. 728,929

Int. Cl.² B26D *5/12*

U.S. Cl. 83—624 **8 Claims**



1. In a power squaring shear having a frame and a reciprocable ram provided with a shear knife and a pair of hydraulic motor devices adjacent to opposite ends of said frame and connected with said ram for effecting working and return strokes thereof; slope control mechanism comprising an upright member normally extending parallel to the direction of reciprocation of said ram and pivoted at one end thereto for angular adjustment in a plane generally parallel to the plane of reciprocation of said shear knife, fluid circuit means for recip-

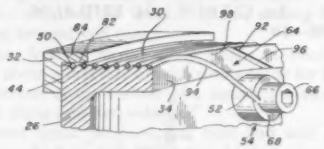
rocating said hydraulic motor devices, means for adjusting said upright member on said pivot to vary the angle between said member and said shear knife, fluid means for variably transferring operating fluid to and from said circuit means to advance or retract one of said motor devices relative to the other to adjust the angular disposition of said shear knife, valve means mounted on said frame for controlling said fluid transfer means, a member slidable on said upright member and means restraining the same against vertical movement relative to said frame whereby said slidable member moves horizontally by and upon angular adjustment of said upright member, a cable extending from said valve, and means guiding said cable from said valve to a point of horizontal connection with said slidable member, said valve being in neutral position when said upright member is in a normal position parallel to the direction of reciprocation of said ram.

4,027,568

REPLACEABLE SURFACE BAND WHEEL

Charles E. Cleland, Naples, Fla., assignor to Continental Machines, Inc., Savage, Minn.

Filed May 24, 1976, Ser. No. 689,512
Int. Cl.² B23D *55/06*; B27B *13/06*
U.S. Cl. 83—788 **41 Claims**



1. A replaceable surface band wheel for a band saw comprising:

a rotatably mounted disk shaped body having an essentially cylindrical peripheral surface, a front face and a rear edge, said peripheral surface having formed therein at least one groove;

at least one elongated member having first and second ends and positioned on said peripheral surface to lie in said at least one groove;

a flange extending radially outwardly from said rear edge of said disk shaped body and partially overlying said peripheral surface thereby slidably retaining said second end of said at least one elongated member;

anchoring means for securing said first end of said at least one elongated member, said flange and said anchoring means for holding said at least one elongated member in said at least one groove on said peripheral surface.

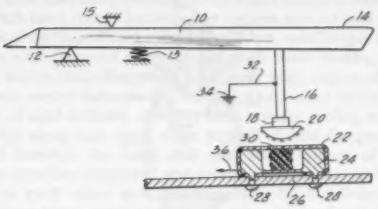
4,027,569

KEYBOARD FOR AN ELECTRONIC MUSICAL INSTRUMENT EMPLOYING VARIABLE CAPACITORS

David A. Luce, Clarence Center, and Anthony Marchese, Cheektowaga, both of N.Y., assignors to Norlin Music, Inc., Lincolnwood, Ill.

Filed June 19, 1975, Ser. No. 588,320
Int. Cl.² G10H *1/02*
U.S. Cl. 84—1.1 **17 Claims**

1. For use with an electronic musical instrument having a keyboard for selecting sounds to be audibly produced, said keyboard having a plurality of pivotal keys, the combination comprising a variable capacitor associated with a key of said keyboard, said variable capacitor having a first conductor, and a second conductor in the form of a resilient conductive member, one of said conductors being shaped relative to the other so that relative movement of said conductors deforms said resilient member from its normal shape, and including a layer of insulation between said first and second conductors, one of said first and second conductors being fixed in position and the other being connected to said key, for movement relative to each other in response to operation of said key of said keyboard, for selectively varying the capacitance of said capacitor in accordance with the amount of movement of said key.

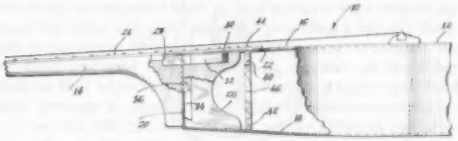


4,027,570

NECK-BODY JOINT FOR GUITAR-LIKE INSTRUMENTS

Stanley E. Rendell, and Richard Schneider, both of Kalamazoo, Mich., assignors to Norlin Music, Inc., Lincolnwood, Ill.

Filed May 12, 1975, Ser. No. 576,326
Int. Cl.² G10D *3/01*, *1/08*, *3/00*
U.S. Cl. 84—293 **13 Claims**



1. In a guitar-like musical instrument having a body with a soundboard forming its upper surface and a headblock secured in the back end thereof and a neck extending from the back of the body, a neck-body joint including:

a tongue extending from the upper portion of the end of the neck which end is in contact with the body; a recess formed in the upper surface of the head block at a position opposite said tongue, said recess being sized to permit said tongue to fit snugly therein, said tongue being firmly secured in said recess when said neck and body are fully assembled; a dovetail projection extending from the end of said neck adjacent to the body; and a dovetail channel formed in said headblock, said channel being positioned opposite the projection of said neck and being sized to have said projection fit snugly therein when said neck and body are assembled.

4,027,571

MUSICAL HORN CONSTRUCTION

Mark S. Veneklasen, 12338 Montana Ave. Apt. 11, Los Angeles, Calif. 90049

Division of Ser. No. 412,334, Nov. 2, 1973, Pat. No. 3,933,078.
This application Jan. 12, 1976, Ser. No. 648,174
Int. Cl.² G10D *9/04*
U.S. Cl. 84—380 R **3 Claims**

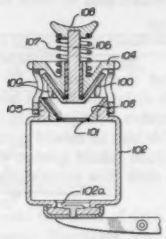
1. A tone hole for a woodwind musical instrument comprising:

a woodwind instrument body having an interior surface;

a tone hole defining seat mounted on said body, the interior surface of said seat being a portion of a cone expanding outwardly from said interior surface of said body to form said tone hole;

a tone hole stopper having an exterior surface of a conical shape complementary to said seat interior surface, said stopper having an inner end which is substantially flush

with said body interior surface when said stopper is in contact with said seat; and



means mounting said stopper for movement toward and away from said seat.

4,027,572

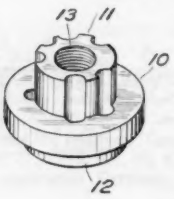
THEFT-PREVENTION SCREW FASTENINGS

William G. Burge, 955 Seven Hills Ranch Road, Walnut Creek, Calif. 94596

Filed May 13, 1974, Ser. No. 469,246

Int. Cl.² B25B *15/00*; F16B *23/00*

U.S. Cl. 85—32 R **5 Claims**



3. A theft-prevention screw fastening device having a special tool-engaging portion, and further means adapted to prevent its removal by the use of conventional tools, wherein the improvement consists of a tool-engaging portion having the following described structure; a cylindrical body having a plurality of spline ways of uniform transverse cross section spaced around, and extending longitudinally, throughout the length of the curved surfaces thereof, and being of random pattern relative to the angularity of their spacing, and a concentric flange at the lower end of said cylindrical body extending outwardly therefrom, and having apertures in axial alignment therewith, and being complimentary to, both in form and dimension, the spline ways of said cylindrical body, whereby only a specially designed tool can be utilized for the application or removal of the device, the actuating elements of the tool being subjected to transverse shear by their insertion in said apertures, and being further subjected to longitudinal shear by the action of said spline ways.

4,027,573

SELF-TAPPING SCREW FASTENER WITH IMPROVED THREAD CONSTRUCTION

Richard C. Laverty, Palatine, Ill., assignor to Interlor Fasteners, Inc., Elk Grove Village, Ill.

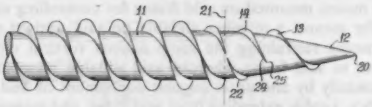
Filed June 20, 1975, Ser. No. 588,964

Int. Cl.² F16B *33/02*

U.S. Cl. 85—46 **3 Claims**

1. A screw fastener element having an integral elongate shank portion formed with a driving head at one end and a conical point portion at the other end and adapted to provide a stage penetration into a work-piece, the improved thread construction comprising:

a first raised helical thread formed on the exterior of the conical point and shank portions and having a generally uniform thread height throughout the length of said shank portion, and having a leading edge extending from near the tip of the conical point and a gradually increasing thread height throughout a portion of the axial length of the conical point; and



said thread height on said conical point decreasing in elevation relative to the increasing diameter of the conical point and diminishing substantially to zero elevation adjacent the juncture of said shank and conical point portions.

4,027,574

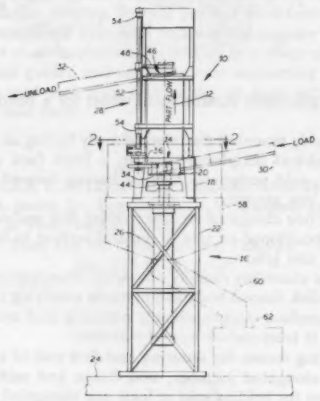
POT BROACHING MACHINE

John Xavier Russell, Troy, Mich., assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Aug. 28, 1975, Ser. No. 608,803

Int. Cl.² B23F *9/04*; B21D *41/06*

U.S. Cl. 90—10 **7 Claims**



1. A pot broaching machine having an integrated workpiece transfer mechanism comprising:

a mounting member;

a pot broach mounted to said mounting member and having a rough workpiece inlet at one end and a finished workpiece outlet at an opposite end;

a rough workpiece loading arm mounted proximately to the inlet of said pot broach operative to move a rough workpiece to a position aligning the rough workpieces with the inlet of said pot broach;

means operative to transfer the rough workpiece through said pot broach to produce a finished workpiece at the outlet of said pot broach;

a finished workpiece unloading arm mounted proximately to the outlet of said pot broach operative to move the finished workpiece away from the outlet of said pot broach; and

means operative to mechanically link said loading arm to said unloading arm to allow said unloading arm to move the finished workpiece away from the outlet of said pot broach whenever said loading arm moves a rough workpiece to the inlet of said pot broach.

4,027,575

ROUTER FOR TRIMMING LAMINATE PLASTICS

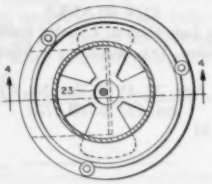
Kenneth N. White, 12650 90th Ave., Palos Park, Ill. 60464

Filed Sept. 27, 1974, Ser. No. 510,013

The portion of the term of this patent subsequent to Sept. 21, 1993, has been disclaimed.

Int. Cl.² B27C *5/10*

U.S. Cl. 90—12 D **3 Claims**



1. A router for trimming adjacent coplanar laminate materials comprising:

a housing having a base;

a power unit within said housing for rotatably driving a cutting blade about a first axis perpendicular to said base;

said cutting blade extending beyond said base;

means for adjusting the amount of said cutting blade extending beyond said base;

a template follower having guide means substantially disposed about a first side of said cutting blade for following the contour of the surface of a template material positioned along said first side; and

a clearance space between said base and said template follower which exposes said cutting blade to a second side substantially opposite said first side for insertion of a second laminate material adjacent said second side for trimming thereupon by said router;

said guide means including a template abutment extending in a plane substantially tangent to the circumference of said blade.

4,027,576

PUMP OR MOTOR HAVING SEALED CHAMBERS

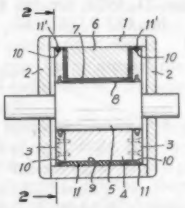
Chifuru Nomura, Chino, Japan, assignor to Kitazawa Shoji Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 5, 1975, Ser. No. 629,136

Claims priority, application Japan, Nov. 11, 1974, 49-136441[U]

Int. Cl.² F01C *9/00;* **F01B** *15/06*

U.S. Cl. 91—339 **4 Claims**



1. In a device, such as a pump or motor, for operating with a fluid under pressure, an elongated shaft member having a longitudinal axis and an elongated cylinder member coaxially surrounding said shaft member and having an inner cylindrical surface of circular cross section directed toward said shaft member, elongated shaft vane means fixed to and extending longitudinally along said shaft member parallel to said axis thereof, said shaft vane means projecting radially from said shaft member toward said cylinder member and having an outer edge region situated next to said inner cylindrical surface of said cylinder member, said shaft vane means having opposed ends and said shaft member carrying at said opposed ends of said shaft vane means a pair of circular flanges which are respectively situated in planes normal to said axis, which extend from said shaft member toward said cylinder member, and which have outer circular edge regions next to said inner cylindrical surface of said cylinder member, said flanges being fixed to said opposed ends of said shaft vane means, axial sealing means extending along said outer edge region of said shaft vane means between the latter and said inner cylindrical surface of said cylinder member and annular sealing means extending along said outer edge regions of said flanges and situated between the latter and said inner surface of said cylinder member, said axial and annular sealing means being joined to each other and providing for slidable fluid-tight engagement between said inner cylinder surface of said cylinder member and said outer edge regions of said shaft vane means and circular flanges, cylinder vane means also extending parallel to said axis, said cylinder vane means being fixed to said cylinder member and extending from said inner surface thereof toward said shaft member, said cylinder vane means being situated between said flanges and having opposed ends respectively adjacent said flanges, and said cylinder vane means having an inner region situated next to said shaft member, so that said cylinder vane means and shaft vane means define between themselves chambers extending longitudinally between said flanges and circumferentially between said cylinder and shaft vane means, and substantially U-shaped sealing means extending longitudinally along said inner region of said cylinder vane means between the latter and said shaft member and along the opposed ends of said cylinder vane means between the latter and said flanges for providing a slidable fluid-tight engagement between said cylinder vane means on the one hand and said flanges and shaft member on the other hand, so that when the device operates as a motor and fluid under pressure is supplied to a chamber situated circumferentially on one side of said shaft vane means between the latter and said cylinder vane means while the chamber which is circumferentially on the other side of said shaft vane means is at a pressure lower than the pressure of said fluid, one of said members will be driven in rotation with respect to the other in one angular direction, while when fluid under pressure is supplied to the chamber at said other side of said shaft vane means between the latter and said cylinder vane means while the chamber on said one side of said shaft vane means is at a pressure less than the pressure of the fluid, said one member will be driven in rotation in an opposite angular direction with respect to the other member, all of said vanes defining between themselves four chambers distributed circumferentially between said vanes about said axis, said cylinder member having means for placing a pair of said chambers which are respectively situated on opposite sides of said one shaft vane alternately in communication with a source of fluid under pressure, one of said flanges being formed with a passage means placing one of said chambers on one side of said one shaft vane in communication with a diametrically opposed chamber and the other of said flanges carrying a passage means placing the other of said chambers on the other side of said one shaft vane in communication with the chamber diametrically opposed to said chamber on said other side of said one shaft vane.

4,027,577

BAG-MAKING APPARATUS AND PROCESS FOR MAKING PORTED BAGS

John A. Thompson, Berkeley, and Robert V. Torres, Pinole, both of Calif., assignors to Cutter Laboratories, Inc., Berkeley, Calif.

Filed July 25, 1975, Ser. No. 599,303

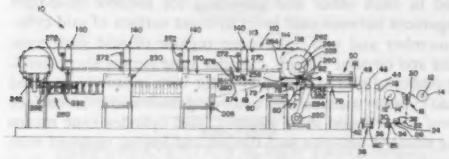
Int. Cl.² B31B *1/84, 23/74*

U.S. Cl. 93—35 PC **13 Claims**

13. In a process for fabricating flexible plastic bags from a

continuous sheet of film, each bag having at least one port sealed thereto, the improvement comprising sequentially

1. pressing the film onto a film retaining conveyor,
2. actuating the conveyor to cause the film to progress to a port sealing unit,
3. aligning a series of flanged tubular ports above a fold line of the film at the port sealing unit, said ports being retained by port retaining means whereby the flanges of the ports are in close proximity to the film,
4. actuating the port sealing unit to cause the film to contact and seal to the flanges of the ports,
5. removing the film from the film retaining conveyor and allowing the film to drape vertically into two plies and be



suspended by the sealed ports which are retained by the port retaining means,

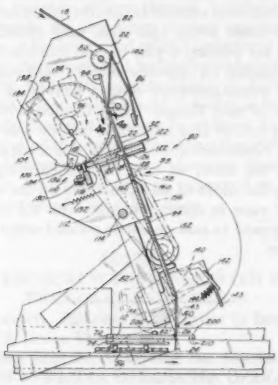
6. actuating the port retaining means to positon the draped film between film smoothing means and two bag sealing plates,
7. actuating the film smoothing means and subsequently actuating the bag sealing plates to smooth the two plies and seal portions of the two plies together to form connected bags,
8. actuating the port retainer means to move the connected bags and position them between cutting plates, and
9. actuating the cutting plates to cause at least a portion of the film between the connected bags to be severed.

4,027,578

DEVICE FOR ATTACHING BOX HANDLES

Leroy M. Varga, Dover, and Robert B. Fitch, Montville, both of N.J., assignors to Rockaway Corporation, Rockaway, N.J.

Filed Apr. 8, 1976, Ser. No. 674,971
Int. Cl.² B31B *1/86*
U.S. Cl. 93—36.7 **29 Claims**



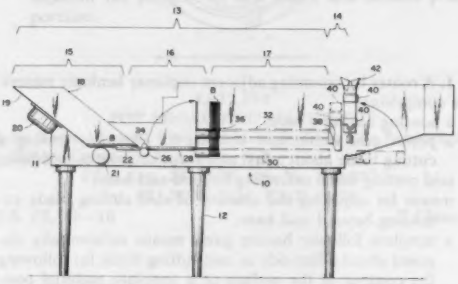
1. A device for securing a web handle to a blank comprising a conveyor, a feed station including means for storing a supply of blanks, said conveyor including means for removing individual blanks from said feed station and carrying the blanks therewith, with one edge of the blanks facing in the direction of travel of the conveyor; a web handle supply station downstream of said feed station in the direction of travel of said conveyor including means for supplying and positioning a web handle of predetermined length to a blank immediately therebelow with the ends of said web handle located in front of said one edge of the blank; and means for securing said web to the blank.

4,027,579

METHOD AND APPARATUS FOR OPENING FOLDED BOX BLANKS

William Leasure; Luis Garcia; Charles Reifel, and Jack Shelton, all of Houston, Tex., assignors to Mira-Pak, Inc., Houston, Tex.

Filed Apr. 22, 1975, Ser. No. 570,504
Int. Cl.² B31B *1/78*
U.S. Cl. 93—53 M **16 Claims**



14. A method of mechanically opening folded blanks having a plurality of folded edges comprising the steps of:

supplying a plurality of blanks to a rotatably mounted screw means for axially advancing the blanks upon the rotation thereof;

rotating said screw means so as to directly present the box blanks one at a time to an opening means comprising a cam and a holding means;

engaging a first folded edge of the blank with said cam;

engaging a second folded edge of the blank with said holding means for holding the second edge of the blank;

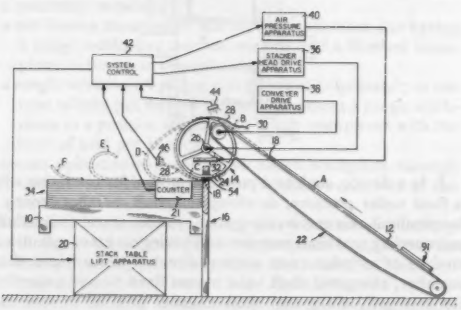
and rotating said cam whereby the folded box is increasing compressed at one folded edge with the rotation of said cam and held at the other folded edge, thereby opening said blank.

4,027,580

PAD STACKER

George Holger Sundin, Duluth, Minn., assignor to Conwed Corporation, St. Paul, Minn.

Filed Nov. 21, 1975, Ser. No. 634,021
Int. Cl.² B31B *1/94*
U.S. Cl. 93—93 M **33 Claims**



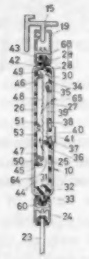
1. A method for stacking flexible pads of low density fibrous materials in at least one aligned stack, which comprises the steps of:

a. receiving and securing the leading edge of at least one pad to be stacked above said at least one stack near one end thereof;
b. rotating said leading edge approximately 180° reversing the relative positioning of the top and bottom of the leading edge and forming a belly in said pad;
c. holding said reverse positioned leading edge at the top of said at least one stack against an index indexing at the said one end thereof;
d. directing an air stream into the said belly thereby assisting the portion of the pad trailing said leading edge to reverse its upper and lower positions along and on said at least one stack; and
e. terminating the holding of said leading edge.

4,027,581
VENTILATOR

Yukio Yamamoto, Kurobe, and Yukio Sado, Shimoniikawa, both of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 16, 1975, Ser. No. 568,709
Claims priority, application Japan, Apr. 25, 1974, 49-47316[U]; Apr. 25, 1974, 49-47317[U]
Int. Cl.² F24F *13/18*
U.S. Cl. 98—98 **10 Claims**



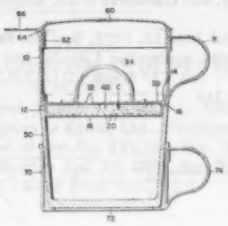
1. A ventilator for use as a component in a window assembly, door assembly or other building hardware, comprising:
a. an inner plate having air vent means formed therein, and having upper and lower flanges extending outwardly;
b. an outer plate engaging said upper flange of said inner plate and secured thereto, said outer plate being spaced from said inner plate in the transverse direction of the ventilator, and providing an air-intake opening vertically displaced from said air vent means;
c. a pair of side caps fitting around the vertical marginal portions of said plates and in vertically surrounding relation to said flanges;
d. a filter fixedly positioned between said plates in spaced relation to both of said plates; and
e. partition means secured to one of said plates and abutting said filter for directing air flow therethrouh remotely from the partition means at least twice.

4,027,582
ART OF BREWING INDIVIDUAL SERVINGS OF COFFEE IN A CUP

Gerard Peter O'Connell, 10 Bemis Road, Holyoke, Mass. 01040

Filed Jan. 19, 1976, Ser. No. 650,556
Int. Cl.² A47J *31/00*
U.S. Cl. 99—306 **1 Claim**

1. An individual coffee maker comprising:
a cylindrical body having a handle and a perforated bottom and having its lower end portion reduced in diameter for the reception of a beverage producing substance,
a perforated partition seatable in spaced relation to the perforated bottom over the lower end portion of the body,
a cover removably seated on the body, a handle on the cover, a beverage cup positionable below the body for receiving the beverage dripped through the lower perforated bottom wall of the body and supporting the body,



a supporting cup having a handle and adapted to receive the beverage cup therein,
the body, partition, and cover being removable from the beverage cup by grasping the handle on the body,
and the cover being adapted to be removed from the body, inverted, and disposed below the supporting cup in the manner of a saucer, the handle on the cover facilitating such removal and inversion.

4,027,583
RACK FOR SUPPORTING POULTRY AND MEAT DURING ROASTING

George Spanek, 212 Eaton Road, San Mateo, Calif. 94402, and Denis C. Spanek, 19135 Brooklane, Saratoga, Calif. 95070

Filed June 28, 1976, Ser. No. 700,566
Int. Cl.² A47J *37/04*
U.S. Cl. 99—421 H **4 Claims**

1. A rack for supporting food products during cooking comprising a lower member and an upper member fitting telescopically into the upper end of said lower member, said lower member comprising a base ring, a plurality of bottom rods spaced around the circumference of said base ring and secured thereto, each said bottom rod curving inwardly and upwardly from said base ring in a plane normal to the plane of said base ring, the upper stretch of said bottom rod being substantially vertical for an extended portion of its length, a first ring fixed to said bottom rods at about the midpoints of their lengths and a second ring fixed to the upper ends of said bottom rods; said upper member comprising an outer ring of a size about equal to said base ring, a plurality of top rods spaced around the circumference of said outer ring and secured thereto, each said top rod extending substantially hori-

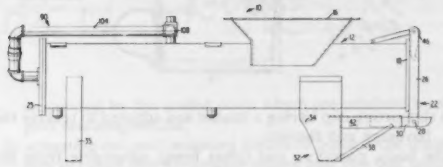
zontally inward from said outer ring and then curving downward to fit inside said second ring and between the upper ends of said bottom rods, the lower ends of opposed pairs of top rods being joined together in lower bends; and a detachable, perforated trough fitting on top of said upper member shaped to receive liquid which drips through the perforations in said trough to baste said food products.

4,027,584

WATER ACTUATED GARBAGE COMPACTOR

Howard M. Sly, 685 Gardiners Road, Kingston, Ontario, Canada

Filed June 12, 1975, Ser. No. 586,343
Claims priority, application Canada, July 5, 1974, 204235
Int. Cl.² B30B *15/32, 1/32*
U.S. Cl. 100—218 **1 Claim**



1. A compacting apparatus operable by a low pressure source of water comprising:

an elongated compression chamber having an inlet feed means including an opening for introducing material to be compacted in said chamber, and a closable opening spaced along said chamber from said inlet feed opening for permitting removal of a slug of compacted material;

a closed hollow press member closely received and slidably supported in said compression chamber for axial movement therealong between an advanced compacting position and a retracted position for permitting introduction of the material into the chamber via said feed means, said press member having one end thereof operable as a ram for compacting said material, said one end having a beveled flange extending in the axial direction about the periphery of said end to scrape said material from the sides of said chamber, and the other end thereof having a wall with two openings therein, said press member being arranged to close off said inlet feed opening as said press member is advanced to effect compaction of said material to thereby prevent escape of material being compacted;

a stationary piston disposed within said hollow press member, said piston including peripheral sealing means slidably engaging said press member at the interior thereof to divide the interior of said press member into two sections;

means for securing said piston against axial movement relative to said compression chamber, said securing means including a pair of tubular pipes extending through said openings in said other end of said press member, said openings in said other end of said press member having sealing means to seal against the pipes while allowing said axially directed motion of said press member within said compression chamber, said tubular pipes being fixedly secured to said piston at one end thereof and being fixed to said compression chamber at the other end thereof, said tubular pipes being adapted to be in fuid communication with a supply of water under relatively low pressure;

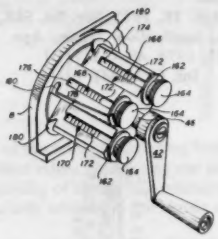
means including said pair of tubular pipes for defining a fluid circuit in flow communication with each of said sections of said press member at the interior thereof and being adapted for connection to a supply of water under pressure, and valve means in said fluid circuit means operable selectively to introduce water under pressure into one of the other of said sections for advancing and retracting the movable press member relative to said elongated compression chamber, wherein said press member is constructed such that one of said sections which is pressurizable by said water to cause advancement of said press member and compaction of material ahead of said press member has a cross-sectional area against which said pressurized water is effective in acting to develop compaction forces which is substantially equal to the cross-sectional area interiorly of the compression chamber.

4,027,585

DOCUMENT IMPRINTER

Myron D. Goldman, Clifton, N.J., assignor to Litton Business Systems, Inc., Belleville, N.J.

Filed Nov. 11, 1974, Ser. No. 522,956
Int. Cl.² B41L *47/46*
U.S. Cl. 101—91 **9 Claims**



1. In a document imprinter having a rotary printing unit rotatable about an axis of rotation, said rotary printing unit including a plurality of banks of selectively settable printing members, said respective banks of printing members being disposed around said rotary printing unit at different angular positions relative to said axis of rotation of said unit; said rotary printing unit further including a corresponding plurality of setting mechanisms for said plurality of banks of printing members, there being one such setting mechanism for an corresponding to and cooperable with each one of said banks of printing members, said respective setting mechanisms being disposed around said rotary printing unit at different angular positions relative to said axis of rotation of said unit, each of said setting mechanisms including display means for displaying the settings of said printing members; said display means for each setting mechanism comprising a bank of display indicia, separate from the corresponding bank of printing members, for displaying in conventional reading orientation the settings of said last-mentioned corresponding bank of printing members; said setting mechanisms further including a plurality of respective viewing window means through which the display indicia of said respective banks of display indicia are viewable, said respective viewing window means being disposed around said rotary printing unit at different angular positions relative to said axis of rotation of said printing unit:

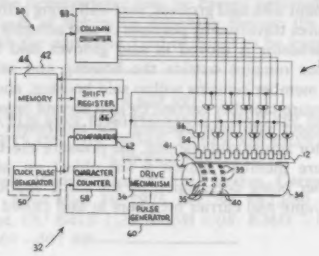
said plurality of viewing window means being so disposed and arranged that all the corresponding banks of display indicia are simultaneously readable through said plurality of viewing window means in one angular rotated position of said rotary printing unit by a person viewing said rotary printing unit along a single line of sight directed towards said plurality of viewing window means;

the angular displacement between adjacent ones of said plurality of viewing window means relative to said axis of rotation of said printing unit being less than the angular displacement between the corresponding banks of printing members relative to said axis of rotation.

4,027,586
METHOD FOR PRINTING A MANUALLY SCANNABLE BAR CODE AND ARTICLES CARRYING A VERTICALLY EXTENDED BAR CODE

David W. Hubbard, Stamford, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Continuation-in-part of Ser. No. 327,508, Jan. 29, 1973, abandoned. This application Dec. 14, 1973, Ser. No. 416,937
Int. Cl.[2] B41J *1/32*
U.S. Cl. 101—93.01 3 Claims



3. In a method of printing lines of vertically oriented readable optical bar codes on a ticket with an automatic high speed bar code printer which prints the bar codes along horizontal vertically spaced lines, the improvement comprising:

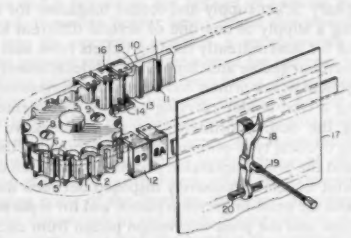
printing a first horizontal line of vertically oriented code bars on a ticket; and

printing a second identical horizontal line of vertically oriented code bars on said ticket in registration with the first horizontal line of bar codes and with the ends of the respective code bars of said second line being in vertical registry and ovelapped relationship with the ends of the respectively adjacent code bars of said first horizontal line whereby a single line of a bar code pattern having an accumulated height that is greater than the height of either of said first and second horizontal lines is thereby formed on the ticket.

4,027,587
PULLEY CONSTRUCTION FOR HIGH SPEED PRINTER BELT

John Tschinkel, Great Neck, and Raymond A. Ballweg, Smithtown, both of N.Y., assignors to Potter Instrument Company, Inc., Plainview, N.Y.

Filed Sept. 8, 1975, Ser. No. 611,020
Int. Cl.[2] B41J *1/20*
U.S. Cl. 101—111 1 Claim



1. In a high speed chain printer, the combination of;

an elastomeric endless timing belt having an elongated rectangular cross-section, a smooth outer surface and carrying teeth extending from top to bottom across the width of the belt and equally spaced along its inner surface;

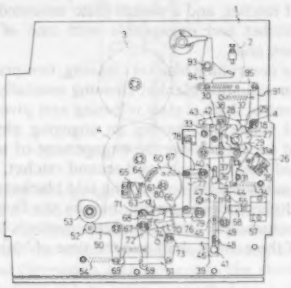
a plurality of character bearing printing slugs attached along the outer surface of said belt and held in place by a pair of pins at the top and bottom of said slug and embracing the top and bottom of one of said teeth while leaving a clear center portion of said teeth;

a pulley for driving said belt along a predetermined path, said pulley including equally spaced peripheral slots matching said clear center portions of said teeth upper and lower clearances for said pins and including ribs between said slots and clearances equal in height to the width of said belt for supporting said belt to its full width in the area between said teeth.

4,027,588
CONTROL MECHANISM FOR AN OFFSET PRINTING MACHINE

Tomoyuki Tasaka, and Yoshinori Honkawa, both of Hiroshima, Japan, assignors to Ryobi, Ltd., Hiroshima, Japan

Continuation-in-part of Ser. No. 429,360, Dec. 28, 1973, abandoned. This application Jan. 22, 1976, Ser. No. 651,464
Int. Cl.[2] B41F *7/24, 7/06, 7/26*
U.S. Cl. 101—144 16 Claims



1. An improvement in a control mechanism for an offset printing machine having:

a machine frame and a drive motor;

a master cylinder adapted to hold a plate thereon, a blanket cylinder, cooperating with said master cylinder and an impression cylinder cooperating with said blanket cylinder, said cylinders being rotatably mounted on said frame;

inking and dampening means cooperating with said master cylinder and coupled to said frame;

a control shaft rotatably mounted on said frame;

a plurality of cams supported by said control shaft;

means for moving said master cylinder and said inking and dampening means, into and out of cooperation with their respective cylinders, said means for moving being coupled to respective ones of said plurality of cams; and

a control knob coupled to said shaft in order to rotate said shaft, said knob having at least neutral, printing and blanket cleaning positions;

said improvement comprising:

means for controlling the rotating movement of said control shaft comprising a first ratchet coaxially mounted on said shaft, a stop pin planted on and projecting from a side face of said first ratchet, first and second stoppers pivotally mounted on said frame and swingably engageable with said stop pin, said first stopper preventing said control shaft from manually operated reverse rotation and said second stopper preventing said shaft from manually operated progressive rotation, a star-like cam coaxially mounted on said control shaft so as to integrally rotate with said ratchet and having indented portions formed on its circumference, and a stop arm pivotally mounted to said frame and having a roller at one end thereof, said roller being in engagement with said indented portions of said star-like cam;

transmission means for transmitting the cyclical output of said drive motor of the machine to said first ratchet, and comprising an output cam, a vertically movable link having a claw pivoted thereon so as to engage with the teeth of said first ratchet and to rotate the first ratchet by an amount corresponding to one of said teeth at a time and also having a projection formed on its middle portion, and a first link mechanism for connecting said output cam to said movable link;

means for controlling said transmission means, comprising a clutch pivotally coupled to said frame and swingably engageable with said projection of said movable link, microswitches, and a solenoid energized by a preselected combination of conditions of said microswitches and connected to disengage said clutch;

means for setting the time of blanket cleaning, comprising a ratchet tooth feeding arm pivotally coupled to said frame and swinging in association with said first link mechanism, a feed claw pivotally coupled to one end portion of said ratchet tooth feeding arm, a stop claw pivotally mounted to said ratchet tooth feeding arm, a second ratchet pivotally mounted to said frame and engageable with said feed claw and said stop claw to rotate said second ratchet, and a switch plate mounted on said second ratchet and engageable with one of said microswitches; and

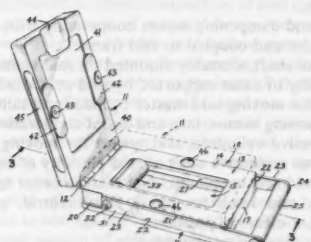
means for controlling blanket cleaning, comprising a further cam for actuating blanket cleaning coaxially mounted on said control shaft, a claw releasing arm pivotally coupled to said frame and having an engaging pin at one end thereof for controlling the engagement of said feed claw and said stop claw with said second ratchet, and a second link mechanism for connecting said blanket cleaning cam to said claw releasing arm, thereby the first link mechanism actuated by the output cam controls both the rotation of the control shaft and the time of blanket cleaning.

4,027,589

PORTABLE IMPRINTER

David G. Timm, St. Paul, Minn., assignor to Timmco, Incorporated, St. Paul, Minn.

Filed May 12, 1975, Ser. No. 576,476
Int. Cl.² B41F *3/04*
U.S. Cl. 101—269 **2 Claims**



1. A portable imprinter adapted for hand-held operation and including a frame member and a carrier member hinged together for relative pivotal movement between an open position, and a closed position maintained by manual force of the operator,

said carrier member comprising means for securing a flat object having raised characters in a predetermined position and supporting said object against pressure applied against said characters;

and said frame member including

a. a rigid housing comprising a flat surface surrounding an opening, and a wall depending therefrom including a pair of ends and a pair of parallel sides having guideway grooves extending parallel to said surface, said opening being so located that in said closed position it is in apposition with an object secured to said carrier member

b. a rigid actuator comprising a pair of elongated arms in sliding engagement longitudinally with said grooves, a first cross member extending between and secured to said arms at locations near first ends thereof, and a second cross member extending between said arms, at locations thereon remote from said first ends thereof, to lie parallel to and displaced from said surface, the lengths of said cross members being such as to retain said arms in engagement with said grooves, said wall being provided with apertures traversed by portions of said actuator so that as said actuator is moved in said grooves said first cross member remains outside the housing and said second cross member remains within said housing, and

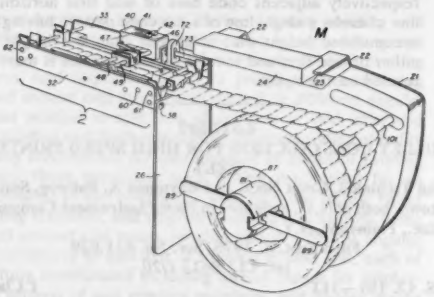
c. a pressure member carried by said second cross member to project into said opening, for movement with said actuator across said opening, the pressure exerted by said pressure member against a flat object on said carrier member being determined by the force applied to hold said frame and carrier members in said closed position.

4,027,590

LABEL, TICKET AND TAG PRINTING MACHINE WITH INTERCHANGEABLE TAPE SUPPLY AND FEEDER MAGAZINES

Maximilian R. Seidl, Munich; Joachim Seidl, Eching, both of Germany, and Walton M. Henry, Rydal, Pa., assignors to Avery International Corporation, San Marino, Calif.

Division of Ser. No. 377,830, July 9, 1973, Pat. No. 3,908,544.
This application Mar. 5, 1975, Ser. No. 555,343
Int. Cl.² B41F *13/64*
U.S. Cl. 101—288 **12 Claims**



1. A unitary ticket-supply-and-feeder magazine for optionally holding a supply of any one of several different kinds of tickets and for intermittently feeding tickets from said supply and for interchangeable attachment to and detachment from a unitary cyclical ticket-printer having a print-impression platen and having a type-holder carrying printing-type-elements for imprinting the desired printed matter on successive tickets and having cyclical type-pressing means for pressing the printing-type and the print-impression platen towards each other so as to imprint tickets successively disposed between the printing-type and the print-impression platen and for separating the printing-type and the print-impression platen from each other after each imprinting and having mechanical ticket-feeder drive-means for driving the ticket-feeder of the magazine in synchronism with the cycles of the ticket-printer when the magazine is attached to the ticket-printer, said type-pressing means and ticket-feeder drive-means of the ticket-printer not being removed from but remaining a part of the ticket-printer when the magazine is detached from the ticket-printer, said magazine including a ticket-supply-holder and ticket-feeder-means including reciprocable ticket-advancing means ar-

ranged to advance a ticket from the ticket-supply-holder towards the print-impression platen of the ticket-printer and including means for selectively accommodating different kinds of tickets, and said ticket-advancing means including a driven member arranged mechanicaly to interengage with the ticket-feeder drive-means of the ticket-printer when the magazine is attached to the ticket-printer, whereby said ticket-feeder drive-means of the ticket-printer is adapted to cause the ticket-feeder of the magazine intermittently to feed tickets from the ticket-supply-holder of the magazine to the ticket-printer in synchronism with the cycles of the ticket-printer, whereby the ticket-printer may be caused optionally to print differnt kinds of tickets by attaching thereto the magazine loaded with the particular kind of ticket to be imprinted.

4,027,591

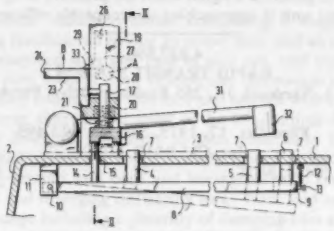
APPARATUS FOR POSITIONING A PAD OR BOOK OF SHEETS ON THE WORK TABLE OF PRINTING APPARATUS

Hans Gubela, Hackenstrasse 8, 8211 Rottau, Germany

Filed Mar. 26, 1975, Ser. No. 562,050

Int. Cl.² B41F *1/28*; B65H *9/08*; B26D *7/16*

U.S. Cl. 101—407 BP **3 Claims**



1. Apparatus for the positioning of a loose leaf or bound pad or book on the work table of an apparatus for printing the individual leaves of the pad or book comprising a holder member which cross-section is of an inverted channel configuration, said holder member being disposed to extend traversely of the work table and located along one end of the work table and movable in a plane normal to the upper surface of the work table by being guided for upward and downward movement in a substantially vertical stand between a raised inoperative position which allows introduction of a pad or book between the holder and the work table and a lowered operative position in which said holder member can contact and hold the pad or book securely in its position on the work table, in which the work holder is acted upon by a spring, one end of which bears on the upper face of the work holder while its other end is braced on the bottom of a recess provided in the stand, the work holder being urged downwardly by the spring into the operative position, a reciprocating actuating lever for moving said holder mounted for traverse movement in the front of the stand, said lever being displaceable against the action of said spring to move the work holder upwardly into its inoperative position, in which position said lever is held by means of a locking lever which cooperates with the actuating lever, said actuating lever having at one end an actuating grip while its other end, which is on the other side of the hinging point of the lever on the stand, is activated on a guide pin connected to the work holder, and a plurality of moveable positioning studs for locating the position of the pad or book on the table, said studs being disposed both on a line extending longitudinally of the work table as well as on a line extending traversely of the work table and located to one side of the work holder, the positioning studs so co-operating with the work holder that in the operative position of the work holder they are disposed in a downwardly depressed inoperative position, while when the work holder is in its inoperative position, they are in their operative position in which they project upwardly from the work table to position a pad or book in the correct position on the work table.

4,027,592

PROPELLANT CHARGE IGNITER WITH STRIKER ELEMENT

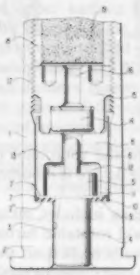
Günter Hübsch, Kalchreuth; Hellmut Bendler, Stein; Rudolf Stahlmann, Furth, and Heinz Gawlick, Vagen, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Filed Feb. 4, 1976, Ser. No. 655,219

Claims priority, application Germany, Feb. 6, 1975, 2504907

Int. Cl.² F42C *1/02*

U.S. Cl. 102—70 R **23 Claims**



1. A propellant charge igniter having a striker means including a rearward shank portion extending through a bottom piece of the propellant charge igniter, a forward headpiece connected with the shank portion and having an enlarged cross sectional dimension with respect to the shank portion, the striker element means being supported on a shoulder of the bottom piece and further including a separable collar member held by a counter member extending over the headpiece, the separable collar member being constructed as a tear collar member at the headpiece and having a forward and rearward end face, the tear collar member being clamped in a form-fitting manner by contacting at its forward end face the counter member extending over the headpiece and being supported at its rearward end face by the shoulder of the bottom piece.

4,027,593

MULTI-DIRECTIONAL SYSTEM FOR ELECTRICAL BOMB FUZES

Carl J. Campagnuolo, Potomac, Md.; Earl T. Smith, Ft. Walton Beach, and Ronald L. Dale, Destin, both of Fla., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 12, 1976, Ser. No. 657,417

Int. Cl.² F42C *11/00*

U.S. Cl. 102—70.2 G **3 Claims**

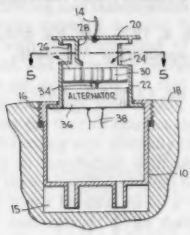
1. A charging device for an electrically fuzed bomb, said charging device capable of being mounted in a first or a second orientation approximately 180° rotated with respect to one another, comprising:

a lanyard-operated pop-up cover including a cylindrical side wall and a flat top plate;

inlet port means and outlet port means oppositely located in said cylindrical side wall for respectively receiving and exhausting slipstream air when said device is mounted on said bomb in said first orientation, the position of said outlet in said second orientation coinciding with the position of said inlet in said first orientation, whereby said inlet and outlet port means serve to respectively exhaust and receive slipstream air when said charging device is mounted in said bomb in said second orientation:

energy converting means for converting slipstream air energy to electrical energy housed in said pop-up cover, said energy converting means comprising a rotatable turbine having a plurality of vanes positioned thereon, said vanes being rotatable by said slipstream air passing between said inlet port means and said outlet port means;

said inlet port means includes means for directing slipstream air onto said rotatable turbine at an angle substantially transverse to the rotational plane of said turbine when said charging device is mounted in said first orientation; and



said outlet port means includes means for directing slipstream air onto said rotatable turbine at an angle of approximately 45° with respect to the rotational plane of said turbine when said charging device is mounted in said second orientation.

4,027,594

DISINTEGRATING LEAD SHOT

John Merrill Olin, St. Louis, Mo., and Venkataramaraj Subbaraj Urs, Godfrey, Ill., assignors to Olin Corporation, New Haven, Conn.

Filed June 21, 1976, Ser. No. 698,440
Int. Cl.² F42B *7/00*
U.S. Cl. 102—92.4 **15 Claims**

1. A pellet formed from finely divided lead particles adhered together into a pellet by a minor amount of a binder, said binder being decomposable in an acid environment such as found in the gizzard of a duck but substantially permanently stable in a more neutral moist environment.

4,027,595

HYDRAULIC APPARATUS

Earl E. Frank, Tallman, N.Y., and Bing S. Yee, Paramus, N.J., assignors to Abex Corporation, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,155
Int. Cl.² B61B *1/00*
U.S. Cl. 104—26 A **22 Claims**

1. In a railroad classification yard having hydraulically operated retarders installed at selected positions along the classification track system, apparatus for furnishing hydraulic fluid to operate the retarders and comprising:

A. a plurality of motor-driven pumps,

at least one to be a normally active pump

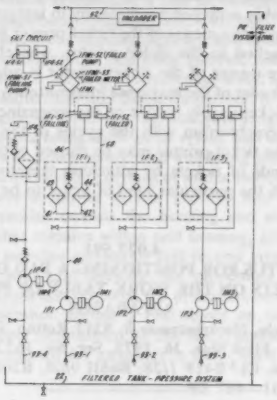
and one to be a normally inactive reserve pump;

B. a plurality of filter units, one for each pump, and through which the related

pump moves fluid under pressure;

C. means to sense the pressure drop across each filter unit and to activate the reserve pump while deactivating the active pump in the event the pressure drop exceeds a predetermined value characterizing unacceptable filter efficiency; and

D. means to sense the pressure drop across each filter unit



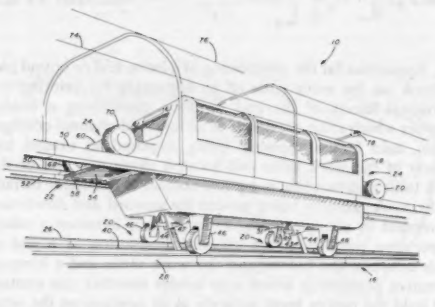
and to generate a signal when the pressure drop indicates a filter unit is approaching unacceptable efficiency.

4,027,596

RAPID TRANSIT SYSTEM

Michael A. Nardozzi, Jr., 255 Rushland Drive, Pittsburgh, Pa. 15235

Filed Oct. 17, 1975, Ser. No. 623,495
Int. Cl.² B61B *13/10*
U.S. Cl. 104—138 R **11 Claims**



1. A rapid transit system for the mass transportation of passengers comprising,

a roadway,

a superstructure for supporting said roadway at grade level and at elevations above grade level,

a plurality of vehicles for transporting passengers between selected points on said roadway, said vehicles each supported for movement on said roadway and having a body portion with a lateral portion being secured to and extending therearound,

stabilizing means secured to said superstructure and positioned above said roadway for maintaining said vehicles on said roadway by movably supporting said lateral portion of said body portion of each of said vehicles,

guidance means including a guide plate secured to and extending downwardly from said vehicle body portion and a recessed means mounted on said roadway for receiving said guide plate for controlling movement of said vehicles on said roadway,

propelling means mounted on said vehicles and having means for engaging said stabilizing means for generating movement of each of said vehicles on said roadway, and

braking means connected to each of said vehicles and oper-

able to move into and out of frictional engagement with a portion of said stabilizing means to control the rate of movement of said vehicles on said roadway.

4,027,597

LINEAR INDUCTION MOTOR WITH DAMPING CAGE

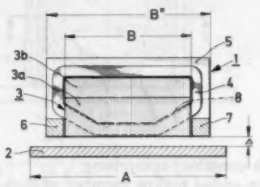
Andreas Lang, Dachau, Germany, assignor to Krauss-Maffei Aktiengesellschaft, Munich, Germany

Filed Oct. 2, 1975, Ser. No. 618,924

Claims priority, application Germany, Oct. 3, 1974, 2447183

Int. Cl.² H02K *41/02*

U.S. Cl. 104—148 MS **8 Claims**



1. A linear induction motor comprising a longitudinally extending reaction rail having an active face; and an elongated stator juxtaposed with said face of said rail, said stator comprising a core formed from at least one lamination stack and having a side confronting said face and formed with a plurality of transverse slots spaced apart in the longitudinal direction, said slots diverging outwardly to their ends away from said reaction rail, respective longitudinally spaced polygonal coils extending around said core and having portions received in said slots and diverging outwardly away from said rail, and a damping cage including a pluarlity of damping bars extending partly around said core and a pair of longitudinally extending conductors flanking said core and electrically connecting said damping bars.

4,027,598

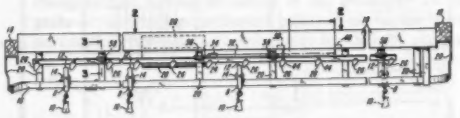
STEPPING CONVEYOR

Wilson H. Swilley, Richmond, Calif., assignor to The Cincinnati Butchers' Supply Company, Cincinnati, Ohio

Filed Oct. 3, 1973, Ser. No. 403,227

Int. Cl.² B61B *13/00*

U.S. Cl. 104—162 **1 Claim**



1. In a stepping conveyor of the type including a plurality of trolley rail hangers each having a substantially vertically disposed surface secured at one end to a ceiling structure and depending therefrom and secured at their other end to a horizontal trolley rail supporting the trolley rail is spaced relation to the ceiling structure, a plurality of work supporting trolleys supported on the trolley rail for movement therealong, and a reciprocating walking beam supported in substantially parallel relationship above the trolley rail and having a plurality of trolley engaging pushers for advancing and spacing trolleys in stepping manner along the trolley rail, the improvement comprising: a horizontally reciprocable walking beam of T-shaped cross-sectional configuration having a vertical web and a pair of substantially flat, coplanar flanges extending in opposite directions laterally from opposite sides of the upper edge of the web; and support means for the walking beam comprising a plurality of stationary walking beam support brackets each including a generally rectangularly shaped base bolted to and in parallel relationship with the vertical surface of the trolley rail hangers, a substantially horizontal, generally rectangularly shaped walking beam support plate welded at one edge thereof to said base and extending substantially perpendicularly therefrom, a pair of substantially flat, coplanar, laterally spaced apart bearing plates releasably secured relative to the underside of the support plate by bolts, a distance greater than the thickness of the flanges of the walking beam to preclude contact of the upper surfaces of said flanges with the lower surface of the support plate, and having coplanar upper bearing areas spaced below the support plate, spacers secured between the undersurface of the support plate and the bearing plates, and a strip of inherently slippery self-lubricating material on the bearing areas slidably supporting the undersurface of the flanges of the walking beam thereon with the web of the walking beam received in the space between the bearing plates, said strip including a first horizontal portion overlying the upper surface of a bearing plate and extended between the bearing plate and spacer associated therewith, a vertical portion extended downwardly across the inner edge of the bearing plate, and a second horizontal portion extended a limited distance rearwardly beneath the bearing plate, bolt means extended through the bearing plates, strips of slippery material, spacers and support plates, securing them together, and means associated with the walking beam to reciprocate it to advance trolleys along the trolley rail in stepping manner and in a common direction.

4,027,599

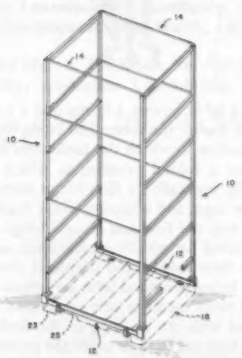
UNITIZING FRAME FOR A PALLET

Lawrence G. Sapp, 621 Lone Palm Drive; James F. Slappey, Tillman Road, both of Lakeland, Fla. 33801, and C. Bart Nixon, 125 NW. 15th St., Oklahoma City, Okla. 73103

Filed Oct. 22, 1975, Ser. No. 624,888

Int. Cl.² B65D *19/44*

U.S. Cl. 108—55.1 **7 Claims**



1. A unitizing frame for a four-way entry pallet, the pallet having an upper surface and including a pair of stringers extending along the sides of the pallet, the stringers having aligned cutout portions in the lower surfaces thereof to provide the four-way entry, and said pallet having an open area across its lateral dimension between the stringers, the unitizing frame comprising:

a pair of like panels having a width substantially equal to the lateral dimension of the pallet, said panels including side members extending the length of the panel;

means for unassistedly supporting said panels vertically on said pallet without obstructing the open area, said supporting means including a pair of bars each having a length substantially equal to the length of the stringers and a plurality of planar members including an upper plate at each end of each bar integral with each said bar and extending inwardly over the upper surface of the

pallet, a side of each upper plate being subtantially flush with an end of the pallet, and at least a pair of lower plates integral with each said bar and extending inwardly of said pallet in individual frictional contact with a portion of the lower surfaces stringers above the cutout of the portions and means on said upper plates for stably, but removably, engaging the lower ends of said side members, said pair of panels interlocking said bars on said pallet; and

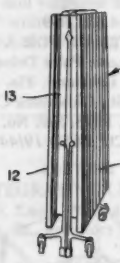
at least one pair of rod members for disengagingly interlocking each side member of one of said pair of panels to the opposing side member of the other of said panels when said panels are held vertically on said pallet by said supporting means.

4,027,600

COMBINATION SAFETY STOP AND DOWN LOCK FOR FOLDING TABLES

Floyd F. Mueller, Two Rivers, Wis., assignor to American Hospital Supply Corporation, Evanston, Ill.

Filed June 17, 1976, Ser. No. 697,208
Int. Cl.² A47B *3/00*
U.S. Cl. 108—113 **9 Claims**



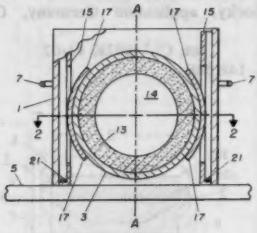
1. In a folding table having a frame and a pair of table tops mounted on the frame, the table tops being movable between an unfolded position in which the table tops extend generally horizontally and a folded position in which the table tops extend generally vertically, a first hinge member secured to one of the table tops, and a second hinge member secured to the other table top, the first and second hinge members being pivotally connected for pivoting movement as the table tops move between their folded and unfolded positions, the first hinge member being provided with an opening therethrough and the second hinge member being provided with an opening which is aligned with the opening in the first hinge member when the table tops are in their unfolded position, a rod reciprocably mounted on the second hinge member and extending through the aligned openings of the first and second hinge members when the table tops are in their unfolded position whereby the hinge members are prevented from pivoting and the table tops are prevented from moving from their unfolded position, the rod extending through the opening of the second hinge member when the table tops are in their folded position and being engageable by the first hinge member as the table tops move toward their unfolded position and as the opening in the first hinge member and the opening in the second hinge member pivot toward each other to prevent further pivoting movement of the hinge member and to prevent the table tops from reaching their unfolded positions, the rod being withdrawable from engagement with the first hinge member so that the table tops can move to their unfolded positions, the rod being insertable into the aligned openings of the first and second hinge members when the table tops reach their unfolded positions.

4,027,601

CONTAINER FOR EXPLOSIVE DEVICE

Frederick R. Hickerson, Newton, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 19, 1976, Ser. No. 678,009
Int. Cl.² F42D *5/04*
U.S. Cl. 109—1 R **6 Claims**



1. A bomb container comprising:

a first open-ended hollow member of high-strength, tough material, adapted to rest either on one end or the side: and

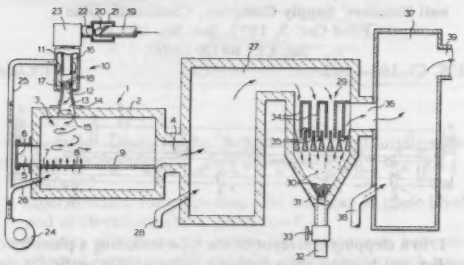
a second open-ended hollow member of similar material positioned completely within said first member with the longitudinal axes of the two members substantially perpendicular to each other, the ends of said second member being contoured to the inner wall of said first member with only a small clearance therebetween: whereby the fragments and blast pressure from the explosion of a bomb within said second member are safely contained.

4,027,602

COMBUSTION SYSTEM

James R. Mott, 1028 Royal York Road, Toronto, Ontario, Canada

Filed Feb. 13, 1976, Ser. No. 657,924
Int. Cl.² F23G *7/00*
U.S. Cl. 110—7 R **9 Claims**



1. A combustion chamber capable of being directly fueled with green bark, green sawdust and the like material, said chamber being generally elongated and having a feed end and a discharge end, the interior of said chamber being formed of refractory material, said chamber having a grate therein at the feed end thereof disposed towards the bottom of the chamber, means for delivering particles of fuel material generally downwardly towards said grate while separating and enveloping the particles with pressurized swirling air; means for directing air upwardly through the grate against the downwardly directed air enveloped fuel particles in sufficient volume and with sufficient pressure and velocity to effect turbulent suspension of a substantial proportion of said fuel particles above the grate, the ratio of air to fuel introduced into said combustion chamber being at least about 7 to 1, said discharge end of said chamber forming a restriction, and said chamber being air

tight apart from said fuel and air input feeds and said outlet whereby said chamber is adapted to operate on a positive pressure with respect to the external ambient pressure.

4,027,603

REFUSE INCINERATOR

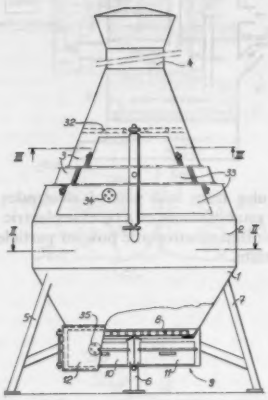
Jacques Lohner, 17, avenue de Chailly, 1012 Lausanne, Switzerland

Filed Jan. 15, 1976, Ser. No. 649,233

Claims priority, application Switzerland, Jan. 21, 1975, 696/75

Int. Cl.² F23G *5/00*; **F23L** *1/00*, *9/02*

U.S. Cl. 110—18 R **4 Claims**



1. A refuse incinerator, comprising;

means defining an enclosed, generally vertical combustion chamber, having a grate in a bottom part thereof, and a chimney in a top portion of the chamber;

means for delivering primary air into a lower part of the combustion chamber at several levels of the lower part;

means for delivering preheated secondary air into an upper part of the combustion chamber at several levels of the upper part; and

an elongate conduit extending in the combustion chamber, having an air inlet in the lower part of the combustion chamber and having an outlet in the proximity of the grate for delivering preheated primary air to the lower part of the combustion chamber and for thereby promoting incineration, including the incineration of humid refuse.

4,027,604

MEANS FOR GOVERNING THE AIR SUPPLY TO A FURNACE

Stig Jansson, Goteborg, Sweden, assignor to Gotaverken Angteknik AB, Goteborg, Sweden

Filed Sept. 29, 1975, Ser. No. 617,672

Claims priority, application Sweden, Oct. 7, 1974, 7412568

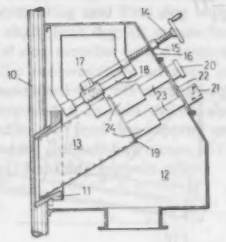
Int. Cl.² F23L *5/00*

U.S. Cl. 110—182.5 **4 Claims**

1. In a device for governing the air supply to a furnace defined by side walls and having a number of air passage ports in at least one of said side walls, a plenum chamber communicating with said air passage ports, said plenum chamber being located outside said side wall, said plenum chamber including a back wall remote from said furnace side wall, at least one sleeve for cooperation with one of said passage ports, said sleeve having an inward end and an outward end, means for axially reciprocating said sleeve move the inward end towards and away from the passage port to adjust an effective air flow passage outside of said sleeve, the improvement of

at least one tubular member projecting cantileverwise inwards from the back wall of said plenum chamber,

a head at the free end of said tubular member,



means for mounting said head at the tubular member so as to permit a displacement of the head in a plane perpendicular to the longitudinal axis of said tubular member, and

means at the inward end of said sleeve for sealingly and telescopically receiving said head.

4,027,605

IMPROVED TUYERE FEED DEVICE

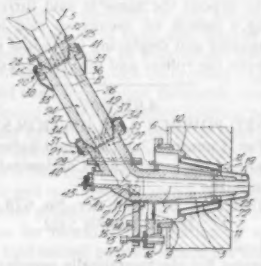
Edouard Legille, Luxembourg, Luxembourg, assignor to S.A. des Anciens Etablissements Paul Wurth, Luxembourg, Luxembourg

Filed Mar. 6, 1973, Ser. No. 339,117

Claims priority, application Luxembourg, Mar. 6, 1972, 064911

Int. Cl.² F23L *1/00*; **C21B** *7/16*

U.S. Cl. 110—182.5 **15 Claims**



1. In a tuyere stock for use in the delivery of a heated gas from a source to a nozzle, said tuyere stock including a plurality of serially connected tubular members, the improvement comprising:

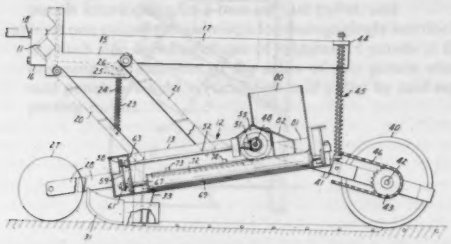
means rigidly connecting said nozzle to a first end of said tuyere stock; and

guide means for supporting said first end of said tuyere stock whereby said nozzle will be maintained in a preselected position, said guide means permitting movement of said stock axially of the desired orientation of the nozzle axis.

4,027,606
PLANTER APPARATUS

Philip B. Knapp, Lynbrook, N.Y., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 28, 1975, Ser. No. 636,112
Int. Cl.² A01C 5/00, 7/18, 7/04
U.S. Cl. 111—77 5 Claims



1. A planter module for sowing a row of seed disks which disks comprise a readily crushable material compacted around a seed, said planter module comprising an elongated generally rectangular chassis, and adjustable support wheel connected to said chassis at the leading end thereof to support the leading end a predetermined height above the ground, a pivotally connected rear packing member attached to the trailing end of said chassis, a parallel linkage attached to the leading end of said chassis and including attaching means for attachment to a tractor mounting bar to position said chassis at an incline from the trailing end downward toward the lead end, spring means for resiliently applying a downward force on said linkage and on said packing member from said mounting bar, a pair of parallel spaced knurled rollers disposed lengthwise of said chassis and positioned to be inclined with said chassis, said knurled rollers being disposed side by side and defining therebetween an elongated vertical open slot, the transverse dimension of said space between said rollers being smaller however than the height or axial dimension of the seed disks, means driving said rollers for rotation about their longitudinal axis in the same direction, a hopper positioned on said chassis above the trailing end thereof and having a trough-shaped open bottom for dispensing seed disks edgewise onto said rollers, singulating means affording movement of the seed disks in a file along said rollers from said hopper, furrow opening means trailing said support wheel for forming a furrow, a seed chute positioned at the leading end of said chassis beneath the leading end of said rollers to transfer seeds from the leading end of said rollers to deposit the same in said furrow, one of said rollers having a helical rib means on said leading end for positively engaging and displacing individual seed disks from the slot between the rollers and into said seed chute.

4,027,607
PULSED POWDER APPLICATION SYSTEM

Peter N. Y. Pan, Country Club Hills, and Rafael J. Hernandez, Chicago, both of Ill., assignors to Continental Can Company, Inc., Chicago, Ill.

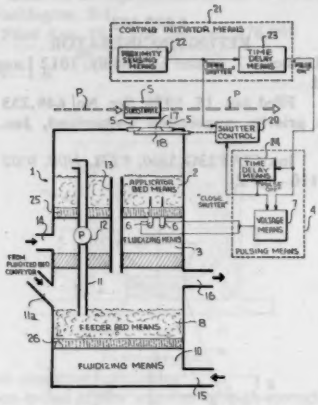
Filed Apr. 20, 1976, Ser. No. 678,676
Int. Cl.² B05B 5/02
U.S. Cl. 118—2 38 Claims

1. An aparatus for electrostatically powder-coating a substrate occupying a coating position adjacent thereto, comprising in combination:

applicator bed means positioned in the vicinity of said coating position for holding electrostatic powder particles, and carrying a pair of electrodes;

fluidizing means adjacent to and operatively associated with said applicator bed means for acting on said electrostatic powder to endow it with fluid-like characteristics; and

pulsing means connected to said pair of electrodes and having a first state for applying a high voltage pulse to said electrodes for a predetermined coating time so as to effect ionization of said electrostatic powder particles whereby to cause the establishment of an electric field attracting said electrostatic powder particles to said substrate, and having a second state for removing said high



voltage pulse from said pair of electrodes whereby to cause the establishment of a reverse electric field attracting said ionized electrostatic powder particles away from said substrate.

4,027,608
SUTURING DEVICE

Norman B. Arbuckle, Costa Mesa, Calif., assignor to Raymond Kelder, Newport Beach, Calif., a part interest

Filed Feb. 20, 1976, Ser. No. 659,743
Int. Cl.² D05B 1/00
U.S. Cl. 112—169 15 Claims

1. A suturing device comprising in combination,

a housing,

a motor in said housing having a rotatable drive shaft,

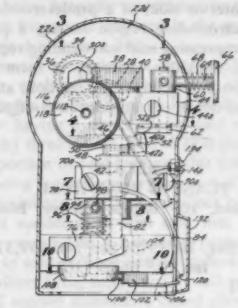
suturing apparatus including a movably mounted suturing needle and a source of suturing thread therefor, and a rotatably mounted driven shaft for moving said needle,

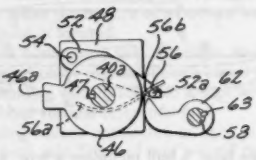
and clutch means interposed between said drive and driven shafts comprising a continually rotating lug on said drive shaft and a catch member movably mounted relative to said driven shaft and biased into a position to be engaged by said lug,

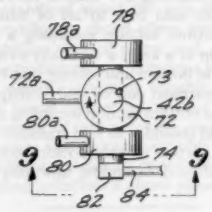
said clutch means further including a cam member movably mounted relative to said housing and having a cam surface normally positioned to move said catch member against its bias to position it out of said first mentioned position for engagement by said lug to thereby prevent rotation of said driven shaft by said drive shaft,

said cam member being movable to a position where said

cam surface is prevented from overcoming said bias and disengaging said catch member from said lug to thereby







permit said lug to engage said catch member and effect rotation of said driven shaft by said drive shaft.

4,027,609
FEED MECHANISM FOR SEWING MACHINES

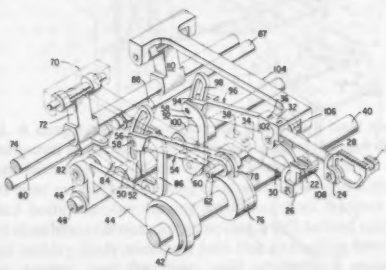
Alexander Fraser Kerr, Dumbarton, Scotland, assignor to The Singer Company, New York, N.Y.

Claims priority, application United Kingdom, May 5, 1976, 18460/76

Filed June 25, 1976, Ser. No. 699,764

Int. Cl.² D05B *27/08*

U.S. Cl. 112—209 7 Claims



1. A feed mechanism for a sewing machine having a casing and a feed mechanism supported therein, said feed mechanism including feed dog means for advancing fabric through said sewing machine for sewing stitches therein, feed dog advance means for imparting a reciprocatory advance motion to said feed dog means including, a driven shaft, first eccentric means connected to said driven shaft and a feed advance shaft for imparting oscillating motion to said feed dog means, said feed dog means including a feed dog member and a feed dog support means for supporting said feed dog member, link means operably connecting said feed dog support means to said feed advance shaft, feed dog lift means for initiating lift motion to said feed dog member in a direction substantially perpendicular to the reciprocatory advance motion of said feed dog means, said feed dog lift means including second eccentric means connected to said driven shaft and being operably connected to said feed dog support means, and said second eccentric means and said link means having a common connection with said feed dog support means.

4,027,610
INTERMITTENT STITCHING DEVICE FOR SEWING MACHINES

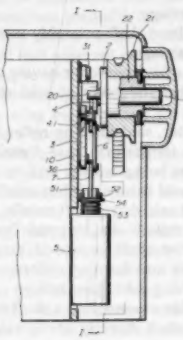
Masakatsu Niikura, Kokubunji, Japan, assignor to Janome Sewing Machine Co. Ltd., Tokyo, Japan

Filed June 23, 1975, Ser. No. 589,533

Claims priority, application Japan, June 26, 1974, 49-72233

Int. Cl.² D05B *69/10*

U.S. Cl. 112—275 13 Claims

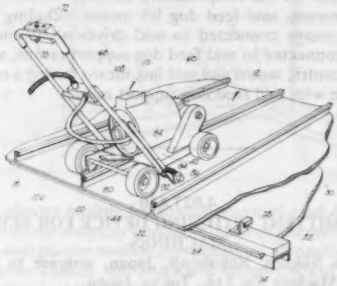


1. A sewing machine comprising, in combination, a housing; a drive shaft rotatably journalled in said housing; an electric motor for rotating said drive shaft and thereby to vertically reciprocate a needle bar; and an intermittent stitching device, said intermittent stitching device comprising engaging means mounted on said shaft for rotation therewith, arresting means normally positioned in an inoperative position permitting the operation of said motor, and moved to an operative position interrupting the operation of said motor when rotation of said engaging means is blocked, blocking means supported on said arresting means and movable between a first position remote from and a second position in the path of the rotation of said engaging means for blocking the rotation of said engaging means when in said second position where the blocking means transmits the movement of said engaging means to said arresting means to move said arresting means from said inoperative position to said operative position interrupting the operation of said motor, and actuating means for moving said blocking means from said first to said second position and from said second to said first position in response to an externally applied start signal, said actuating means comprising a solenoid having an armature, and a control circuit means including a power source, foot controller switch means connected to said power source and externally operable to furnish said start signal, and start switch means for connecting said motor and the solenoid to said power source upon receipt of said start signal.

4,027,611
SEAM FORMING APPARATUS

Donald H. Ward, Middletown, and John K. Buffenbarger, Monroe, both of Ohio, assignors to Armco Steel Corporation, Middletown, Ohio

Filed Apr. 22, 1976, Ser. No. 679,451
Int. Cl.² B21D *37/00*
U.S. Cl. 113—54 R **10 Claims**



1. A seam forming apparatus for forming standing seams to interconnect pairs of adjacent metallic panels, which comprises:

a. a wheeled carriage;

b. a horizontal drive shaft rotatably mounted to the underside of said carriage;

c. a drive roller, said drive roller having a surface to frictionally engage the underside of said standing seam being formed;

d. a forming roller, said forming roller having a peripheral configuration to perform said forming, said drive and forming rollers being coaxial and mounted nonrotatably on an end of said drive shaft but axially shiftable thereon;

e. means to shift said drive shaft axially, whereby said drive and forming rollers are stripped from said drive shaft when said drive shaft is moved axially and withdrawn from said drive and forming rollers;

f. means for driving said drive roller;

g. a pressure roller mounted on a shaft substantially parallel to said drive shaft directly above said drive roll so that during the operation of said apparatus, that portion of said standing seam to be formed that is not formed is squeezed between said pressure and drive rollers;

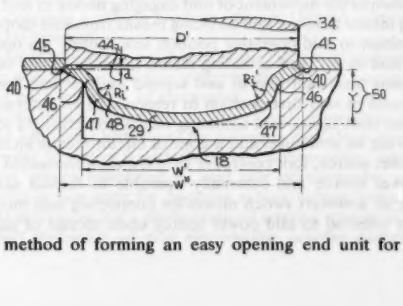
h. means to release said pressure roller; and

i. means for guiding said carriage along said standing seam.

4,027,612
METHOD FOR FORMING CONTAINER SCORED METAL FLAP AREAS

Edward J. Herbst, Posen, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Filed July 16, 1975, Ser. No. 596,502
Int. Cl.² B21D *51/38*
U.S. Cl. 113—121 C **2 Claims**

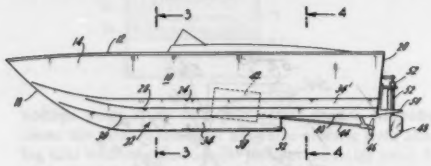


1. A method of forming an easy opening end unit for a container, which end unit is resistant to blowout pressure from within said container, said method comprising the steps of providing a sheet material blank having an interior side; drawing an inner portion of the blank into a convex configuration, relative to said interior side, of a predetermined depth and bounded by a surrounding region having a predetermined thickness; and compressing said surrounding region to reduce its predetermined thickness, whereby to form a web of reduced thickness bounding said inner portion, and to increase the predetermined depth of said convex configuration.

4,027,613
PLANING BOAT HULL

Donald L. Wollard, 105 Bayview Drive, Islamorada, Fla. 33036

Filed Dec. 10, 1975, Ser. No. 639,372
Int. Cl.² B63B *1/18*
U.S. Cl. 114—291 **9 Claims**

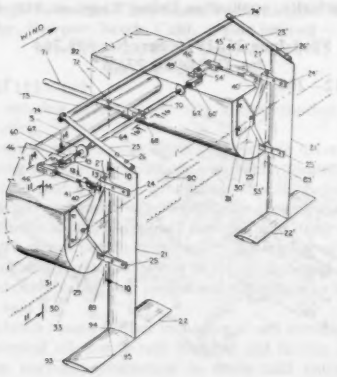


1. In a planing boat, a hull including a bow, a transom, top sidewalls and a bottom extending from said bow to said transom, said bottom including a V-shaped forward bottom section extending from said bow to aft of amidships, said V-shaped forward bottom section including a pair of bottom sidewalls which join at a keel, a vertically extending shoulder extending across the bottom and joining said bottom sidewalls and defining the rearmost end of said V-shaped bottom section and a rearward bottom section including a transverse wall extending from said shoulder to said transom and a continuation of the upper portion of said bottom sidewalls joined to said transverse wall and extending upwardly and outwardly therefrom.

4,027,614
SAILBOAT CONSTRUCTION

Clyde B. Jones, 3531 Alginet Drive, Encino, Calif. 91436

Filed Apr. 7, 1975, Ser. No. 565,348
Int. Cl.² B63H *25/06*
U.S. Cl. 114—163 **8 Claims**



1. In combination with a sailboat having at least one sail, at least one mast, a vertical reference line passing through the center of gravity of said sailboat when in level position, a hull

assembly, said hull assembly comprising at least one hull; antiheel structure comprising:

rudder means comprising a first rudder and a second rudder spaced apart from each other, said first and said second rudders being hingedly connected to said hull assembly with each hinge axis oriented in the general direction of said vertical reference line;

stabilizer means comprising a first stabilizer and a second stabilizer, each said stabilizer being airfoil-like in shape and having a leading edge and a trailing edge, each said stabilizer having a chord plane, said chord plane being defined by three points, two of said points being located on any portion of said leading edge and the third of said points being located on any portion of said trailing edge of said stabilizer, said first stabilizer being supported by said first rudder such that said first stabilizer's chord plane is oriented in a generally perpendicular position relative to said sailboat vertical reference line, said second stabilizer being supported by said second rudder such that said second stabilizer's chord plane is oriented in a generally perpendicular position relative to said sailboat vertical reference line, each said stabilizer being adapted to move under the surface of a body of water upon which said sailboat is located;

pivot means connecting said stabilizer means to said hull assembly, whereby said stabilizer's chord planes are capable of assuming various selected angles with respect to the said sailboat vertical reference line;

first actuating means connected to said rudder means for moving both said first and said second rudders and their respective said stabilizers;

second actuating means for pivotly moving simultaneously each said stabilizer about the axis of said pivot means, said first stabilizer's chord plane pivots opposite to said second stabilizer's chord plane; and

said second actuating means includes a linkage assembly, an actuating member assembly capable of being manually controlled being connected to said linkage assembly, upon movement of said actuating member assembly in a single direction said linkage assembly includes means for causing said first stabilizer's chord plane to pivot opposite to said second stabilizer's chord plane.

4,027,615

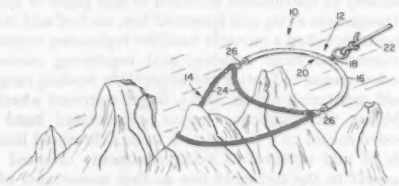
BOAT ANCHOR

Roland F. Cribbs, 86 Bahama Circle, Tampa, Fla. 33606

Continuation of Ser. No. 513,239, Oct. 9, 1974, abandoned. This application Oct. 23, 1975, Ser. No. 625,004

Int. Cl.² B63B *21/24*

U.S. Cl. 114—311 **4 Claims**



1. A drag type boat anchor for use with a boat specifically configured to facilitate anchoring engagement and disengagement with objects lodged on the bottom of a body of water; said boat anchor comprising a substantially rigid unitary elongated body member having an attachment formed thereon, said attachment means for attaching a line to said substantially rigid unitary body member, said line extending between said boat anchor and the boat, said attachment means being formed at substantially the mid-portion of said substantially rigid unitary elongated body member to maintain said substantially rigid unitary body member on the substantially horizontal position, anchoring means including at least one substantially flexible anchoring element to engage objects lodged on the bottom of the body of water, said substantially flexible anchoring element being fixedly attached to opposite ends of said substantially rigid unitary elongated body member such that said boat anchor engages and disengages objects lodged on the bottom of a body of water by the horizontal position of said anchor relative to the objects.

4,027,616

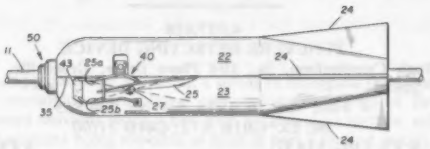
PROTECTION MEANS FOR DEPTH CONTROL DEVICE

Robert O. Guenther, Irving; Donald F. Huffhines, Richardson; James W. Krall, Irving, and Charles D. Ray, Dallas, all of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 10, 1975, Ser. No. 639,534

Int. Cl.² B63B *21/00*

U.S. Cl. 114—244 **8 Claims**



1. A depth control device for a marine seismic cable or the like, said device comprising:

a hull adapted to be positioned onto said cable;

a pair of wing members pivotably mounted on said hull;

a pair of protective means, each of said protective means attached to said hull adjacent each of said wing members, respectively, to prevent an obstacle such as a buoy line or the like from becoming fouled in the gap normally existing between a wing member and said hull, each of said protective means comprising:

a pair of elements, one of said elements being attached to said hull at a point above said wing member and the other of said elements attached to said hull below said wing member, both of said elements extending from a point on said hull forward of said wing member to a point over and below, respectively, said wing member, said elements extending outward from said hull at an angle greater than the angle formed by the leading edge of a respective wing member with said hull whereby said elements form an unbroken path between said hull and said leading edge of said wing member which directs said obstacle away from said hull and off said wing member.

4,027,617

GRATING APPARATUS FOR PROTECTING THE DRAFT PORT OF A WATER-JET PROPULSION SYSTEM

Tsunemi Ikeda, and Tamotsu Sezaki, both of Akashi, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Mar. 16, 1976, Ser. No. 667,313

Claims priority, application Japan, Mar. 27, 1975, 50-42570[U]

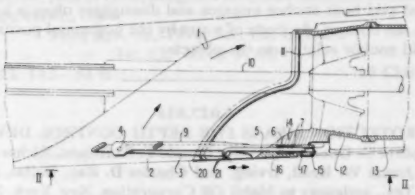
Int. Cl.² B63H *11/04*

U.S. Cl. 115—14 **5 Claims**

1. Apparatus for protecting the inlet water port of a water-jet propulsion apparatus, comprising,

a fixed bracket positioned at the mouth of said inlet port and having an opening therein sufficiently large to permit manual access therethrough, a grate rotatably attached to said bracket to permit said grate to be rotated to first and second positions to prevent manual access through said bracket and to permit manual access through said bracket respectively, and a pin spring biased to connect said grate to said bracket to hold said grate in said first position, whereby said spring biasing can be manually overcome to disconnect said grate from said bracket

said pin being spring biased in the direction of flow of water in said water-jet propulsion system, whereby the force of



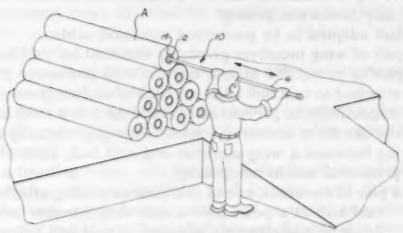
water pushing against said pin during normal operation will not oppose the spring biasing force.

4,027,618

PUNCTURE DETECTING DEVICE

Hugh Cunningham, Jr., 104 Plano Drive, Greenville, S.C. 29609

Filed Nov. 10, 1976, Ser. No. 740,555
Int. Cl.² G01B 5/12; G01D 21/00
U.S. Cl. 116—114 G **6 Claims**



1. A handtool device for detecting puncture openings in an interior bore surface of a tubular carrier member upon which carpet and the like is rolled for transportation comprising:
an elongated adjustable length rigid handle member for moving said device through said tubular bore;
an adapter body member carried adjacent one end of said handle member;
a plurality of resilient bendable prong elements carried by said adapter member inclined to the axis of said handle member extending outwardly therefrom; and
said prong elements having free ends biased against said interior bore surface when inserted therein for engaging within a puncture opening when detected during movement through said bore.

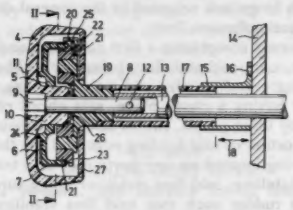
4,027,619

INDICATION OF ROTARY SPINDLE ADJUSTMENT

Klaus Sturhan, Lemgo, and Gerd Lange, Minden, both of Germany, assignors to Gebr. Isringhausen, Lemgo, Germany

Filed Aug. 27, 1975, Ser. No. 608,332
Claims priority, application Germany, Aug. 27, 1974, 2440979; Dec. 2, 1974, 2456828; Mar. 22, 1975, 2512736
Int. Cl.² G12B 11/04
U.S. Cl. 116—124 A **29 Claims**

1. An adjustment indicator for a rotary spindle, comprising a hollow and at least partly transparent handwheel for operating the rotary spindle, and an indicator device disposed in said handwheel whose reading is controlled as a function of the revolutions of the rotary spindle, said handwheel being constructed with a transparent front and peripheral surface, and an indicating dial being rotatably mounted coaxially in the handwheel, reading scales being located on the front face and on a broadened peripheral edge of said indicating dial, a planetary gearing mounted in said handwheel and being operatively connected to said indicating dial for producing 360° rotation thereof, a holding device mounted on a stationary bearing wall of the rotary spindle mounting and cooperating



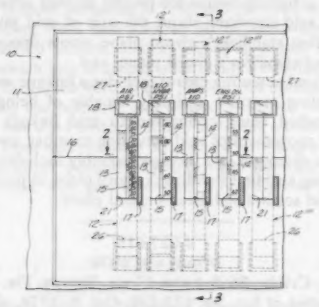
with said planetary gearing to locate a fixed point of said planetary gearing, said planetary gearing including a sun wheel that is mounted on the inner hub of said handwheel and a web of said planetary gearing being formed in said handwheel.

4,027,620

INSTRUMENT PANEL

Lawrence J. Kirsch, 1847 Preuss Road, Los Angeles, Calif. 90035

Filed Jan. 5, 1976, Ser. No. 646,474
Int. Cl.² G09F 9/00
U.S. Cl. 116—129 T **4 Claims**



1. An instrument panel, comprising:
a panel having a threshold line on a surface thereof; and
a plurality of instruments mounted to said panel in spaced arrangement along said threshold line, each of said instruments including a movable bandlike registering means, an enumerated band adjacent said registering means, a coded means indicating the acceptable reading range of said registering means, and a finger operated wheel for shifting the registering means, enumerated band and coded means as a unit relative to said threshold line;
each of said instruments being commonly oriented with respect to the threshold line so that movements of the bandlike registering means are all transverse to the threshold line.

4,027,621

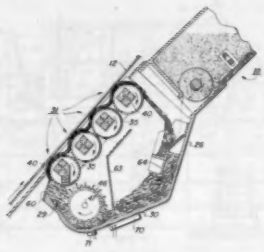
DEVELOPING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINES

Thomas J. Kane, Rochester, and Richard H. Dennie, Macedon, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 14, 1975, Ser. No. 558,596
Int. Cl.² G03G 15/08
U.S. Cl. 118—5 **7 Claims**

1. In a developing apparatus for an electrostatic reproduc-

tion machine adapted to produce copies of an original and having a photosensitive member on which latent electrostatic images of the original are formed, with means to bring relatively dry particulate developing material into developing relationship with the machine photosensitive member to develop the images on the photosensitive member, the improvement comprising:



means to control humidity conditions of said developing material whereby to assure optimum development of said images despite changes in relative humidity,

said humidity control means including a heater for heating said developing material, means for actuating said heater on a predetermined low temperature of said material, and timing means for restricting actuation of said heater to preset time int rvals.

4,027,622

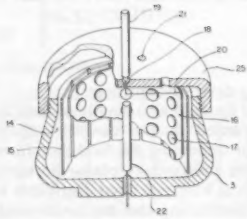
APPARATUS FOR DOPING SEMICONDUCTORS IN CENTRIFUGE

Paul Schmider, Munich-Oberfoehring, Germany, assignor to Beckman Instruments G.m.b.H., Munich, Germany

Division of Ser. No. 458,972, April 8, 1974, Pat. No. 3,957,547. This application Jan. 26, 1976, Ser. No. 652,440

Int. Cl.² C23C *13/08*

U.S. Cl. 118—49.5 **5 Claims**



1. Apparatus for incorporating impurity substance in a solid state material comprising:

a. a centrifuge rotor with means for rotating it about an axis, said rotor having a hollow interior with a surrounding wall having an inner surface;

b. means for heating disposed adjacent said inner surface, said heating means including means for holding solid state basic material; and,

c. a layer of thermal insulating material disposed between said heating means and said inner surface.

4,027,623

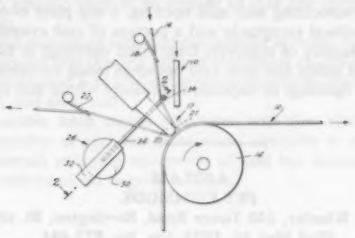
SAMPLE MIXER AND SPREADER

Stanford L. Adler, Monsey, N.Y., assignor to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed June 23, 1975, Ser. No. 589,483

Int. Cl.² B05C *1/14*

U.S. Cl. 118—108 **7 Claims**



1. Apparatus for preparing a smear of biological fluid sample containing particulates, comprising: an elongated first element movable along a first path and having a surface, said first element being movable at least in part a limited distance in a direction substantially transverse of said first path, an elongated second element having a surface movable along a second path, means locating portions of said surfaces longitudinally in at least close proximity to one another to define a cusp therebetween, means for selectively introducing a predetermined discrete volume of said sample between said surface portions, means for relatively moving said first and second elements along said first and second paths, respectively, to draw a smear of said sample on said second element surface, and means spaced from said locating means moving said first element back and forth in said transverse direction at least during relative movement of said first and second elements.

4,027,624

FLUID GRANULATING/COATING APPARATUS UTILIZING SUCTION AIR CURRENT

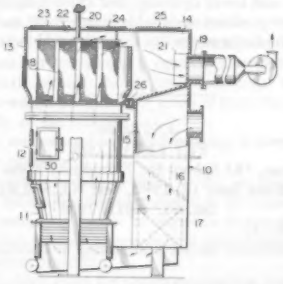
Shimesu Motoyama, Tokyo, Japan, assignor to Freund Industrial Co., Ltd., Tokyo, Japan

Filed Sept. 19, 1975, Ser. No. 615,123

Claims priority, application Japan, Sept. 20, 1974, 49-113203

Int. Cl.² B05B *17/00*

U.S. Cl. 118—303 **5 Claims**



1. In apparatus designed to perform granulation or coating by spraying a prescribed liquid to deposit on the material accommodated in a container disposed in the lower part of the apparatus while whirling up said material by means of suction air current, said fluid granulating or coating apparatus to be worked by utilizing suction air current and in which a receptacle in the shape of a cylinder with a smooth interior accommo-

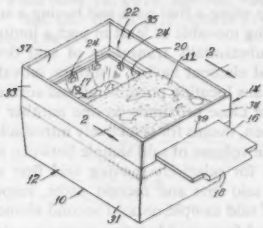
dates bag filters disposed in the upper part of the apparatus to catch the whirled-up material, an exhaust passage in the upper part of the apparatus including a portion offset laterally from said receptacle and an opening in a side surface of the apparatus through which said suction air current is to be discharged from said cylindrical receptable, means for generating said suction air and a damper for suspending air suction disposed away from a location directly above said cylindrical receptacle and communicating with said opening, a top plate over both said cylindrical receptacle and a portion of said exhaust passage, a plurality of relatively large-sized openings in said top plate, and safety lids over said openings being movable from over said openings in response to pressure within said apparatus.

4,027,625

PET COMMODE

David C. Wheeler, 240 Tower Road, Barrington, Ill. 60010

Filed May 14, 1975, Ser. No. 572,481
Int. Cl.² A01K *29/00*
U.S. Cl. 119—1 **10 Claims**



1. A commode for pets adapted to contain a litter material, comprising:

an opened mouth rigid base having a hollow interior;

an opened mouth box disposed on top of said base and having a lower normally closed opening, said lower opening being substantially smaller in size than said mouth of said base; and

said box includes inner and outer walls, said outer wall being supported by said base, said inner wall being connected to said outer wall and sloping downwardly and inwardly and terminating in said lower opening, mounting means disposed at said lower opening for supporting a closure, said closure movably mounted on said box for supporting the litter material and for normally closing and sealing said lower opening, said closure being movable to an open position to enable used litter material to fall under the force of gravity through said lower opening and into said base.

4,027,626

PET ELEVATOR

Peter DeSousa, 183 School St., Stoughton, Mass. 02072

Filed June 12, 1975, Ser. No. 582,821
Int. Cl.² A01K *1/00*
U.S. Cl. 119—15 **1 Claim**

1. A pet elevator device comprising in combination with a cage,

horizontal tube means for connecting to an animal cage,

vertical tube means interconnecting said horizontal tube means whereby a pet can leave said animal cage and climb from one horizontal tube to a higher horizontal tube

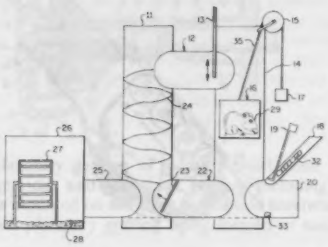
a second vertical tube containing an elevator (tube) parallel to said first vertical tube interconnecting said horizontal tubes,

said elevator responsive to the entrance of a pet whereby the pet is brought from the higher level horizontal tube to the lower level horizontal tube

said elevator counterbalanced to return to said higher level in response to the exit of a pet,

a food receiving tube accessible when said elevator is in a lower mode extending said lower level horizontal tube,

a food dispenser affixed said food receiving tube responsive



to the movement of said elevator wherein a preselected quantity of food is deposited in said food receiving tube with each operation of the elevator encouraging the operation of the elevator by the pet,

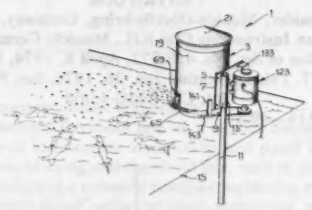
gate means in said lower horizontal tube interposed between said interconnected vertical tubes which forces the animal to ascend said first verticle tube to gain access to the elevator.

4,027,627

AUTOMATIC FOOD FEEDING DEVICE FOR FISH, FOWL AND THE LIKE

Romeo Fillion, 2425 Chapleau Street, Sillery, Quebec, Canada (G1T 1M5)

Filed Mar. 6, 1975, Ser. No. 556,197
Int. Cl.² A01K *5/02, 61/02*
U.S. Cl. 119—51.11 **9 Claims**



1. A feeding device comprising:

a. a canister for holding a supply of food to be dispensed;

b. means carried by the canister adjacent the bottom thereof for dispensing the food therefrom;

c. a rotatable substantially planar horizontal surface provided with at least one fixed distributor blade for receiving and distributing the dispensed food by centrifugal force upon rotation of the surface; and

d. adjustable retaining means for controlling the distribution of a width of food in a substantially tangential direction with respect to the rotatable surface, which retaining means includes a vertical wall surrounding a substantial portion of the periphery of the rotatable surface and having:

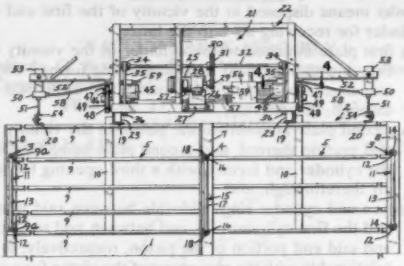
1. a fixed portion, and

2. a movable portion that is adjustble relative to the fixed portion along a horizontal path for defining a variable width peripheral opening therewith to thereby control the width of the food being distributed.

4,027,628
AUTOMATIC FEEDING SYSTEM FOR GESTATING LIVESTOCK

Robert M. Butler; John T. Butler, and James G. Butler, all of Box 221, Rte. 1, Austin, Minn. 55912

Filed Jan. 12, 1976, Ser. No. 648,192
Int. Cl.² A01K 5/00
U.S. Cl. 119—52 B 2 Claims

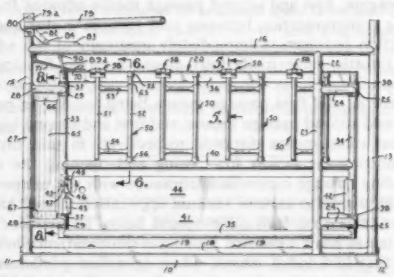


1. An automatic feeding system comprising:
a. open framework including laterally spaced parallel outer longitudinal frames, an intermediate longitudinal partition frame, and longitudinally spaced transverse frames connecting said longitudinal frames and cooperating therewith to define a pair of rows of open topped stalls;
b. a pair of laterally spaced parallel rails extending longitudinally over said framework;
c. a hopper having a pair of discharge openings each overlying a different row of said stalls adjacent said intermediate longitudinal partition frame;
d. wheel means on said hopper for supporting the hopper on said rails for movement over said stalls;
e. power operated means for imparting rotation to said wheel means;
f. a pair of conveyors in the bottom of said hopper each disposed to deliver material from the hopper to a different one of said discharge openings;
g. separate drive means for driving each of said conveyors independently of the other thereof; and
h. separate control means individual to said separate drive means for causing material from said hopper to be delivered to predetermined ones only of said stalls.

4,027,629
LIVESTOCK SQUEEZE CHUTE

Laurence B. Pearson, Thedford, Nebr., assignor to Pearson's, Inc., Thedford, Nebr.

Filed June 30, 1975, Ser. No. 591,488
Int. Cl.² A61D 3/00
U.S. Cl. 119—99 3 Claims

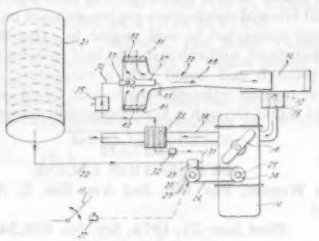


1. In a livestock squeeze chute having a frame and laterally spaced sides supported on said frame for movement toward and away from one another to squeeze an animal therebetween, the combination therewith of:
a bar section on at least one side, said bar section comprising a pair of spaced apart upright members interconnected by cross members with at least one upright member having an upper end and a lower end,
upper and lower coupling means on said one side providing a rotatable coupling for said upper and lower ends thereby to permit swinging movement of said bar section to different angular positions relative to said side, said coupling means arranged to provide for disconnection of said lower end from the lower coupling means in response to upward vertical movement of said one upright member,
means associated with said one upright member operable to prevent said upward vertical movement except when said bar section is in a predetermined angular position relative to said side, and
releasable latch means associated with the other upright member of said bar section and operable to releasably restrain swinging movement of said bar section to said predetermined angular position.

4,027,630
VAPOR INJECTION APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

Dante S. Giardini, Dearborn Heights, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Mar. 22, 1976, Ser. No. 669,428
Int. Cl.² F02M 25/02
U.S. Cl. 123—25 P 10 Claims



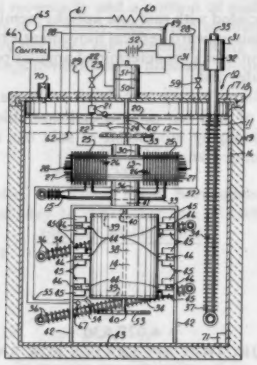
1. Vapor injection apparatus for controlling the vapor content of air supplied to a carburetor of an internal combustion engine, comprising:
a housing having an air intake chamber in communication with an air intake passageway of a carburetor,
valve means on the housing operative to permit flow of atmospheric air into the air intake chamber when the air pressure within the chamber is lower than the air pressure externally of the housing,
air injector means coupled to the housing in communication with the chamber,
steam generating means coupled to the air injector means,
and pump means for pumping liquid to be vaporized in the steam generating means in response to movement of an accelerator control means into a predetermined engine acceleration position,
the flow of vapor from the steam generating means through the air injector means causing aspiration of air into the air injector means and admixing of the air and steam for discharge into the housing chamber,
the air-vapor mixture raising the pressure within the chamber causing the valve means to close the chamber to the admittance of atmospheric air through the valve means whereby the air-vapor mixture becomes the sole air supply to the air intake passage of the carburetor.

4,027,631

COMBUSTION ENGINE DRIVEN LIQUID HEATER

Elzie E. Lavery, 424 S. Mount Vernon Ave., Uniontown, Pa. 15401

Filed July 6, 1976, Ser. No. 703,120
Int. Cl.² F22B *3/06*; F28C *3/00*
U.S. Cl. 122—26 **14 Claims**



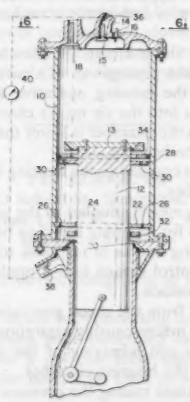
1. An internal combustion engine driven liquid heater comprising a tank containing a liquid to be heated, an internal combustion engine suspended in said tank and submerged in said liquid and adapted to operate in its submerged condition, friction heater means submerged in said liquid and driven from said internal combustion engine, exhaust pipe heat transfer means connected to said engine to exhaust combustion fumes therefrom, said exhaust pipe heat transfer means meandering through said liquid before exhausting to the atmosphere to transfer exhaust heat to said liquid, and means to flow said liquid through a heat dissipation system.

4,027,632

AIR INJECTION ENGINE

William Wagner, Box 366, 2nd Ave. Rte. 2, Absecon, N.J. 08201

Filed June 21, 1976, Ser. No. 698,545
Int. Cl.² F02B *75/02*
U.S. Cl. 123—75 RC **4 Claims**



1. In an internal combustion engine having a cylinder, the cylinder having first and second ends, a piston having an end portion for movement towards and away from the second cylinder end, the piston being reciprocally movable in the cylinder, inlet means for receiving a combustible fuel mixture into the cylinder, a spark plug for igniting the combustible mixture therein under compression, and an exhaust valve for expelling the exhaust products of the ignited fuel mixture from the cylinder, the inlet means, the spark plug and the exhaust valve being mounted in the vicinity of the second end of the cylinder, the improvement comprising:

inlet means disposed in the vicinity of the first end of the cylinder for receiving air into the latter;

a first plate attached to the cylinder in the vicinity of the first end thereof, said first plate being formed with first and second openings for the piston and air to pass therethrough, respectively;

a second plate attached to the piston in the vicinity of the end portion thereof, said second plate being fittable into the cylinder and formed with a third opening for passing air therethrough; and

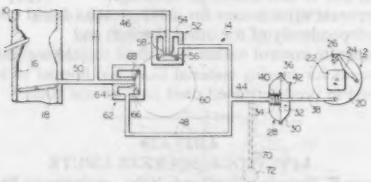
piston and cylinder rings slideable between said first plate and the first cylinder end, and between said second plate and said end portion of the piston, respectively, in timed relationship with the movement of the piston for a control of the air received into the cylinder through said air inlet means.

4,027,633

IGNITION TIMING CONTROL SYSTEM

Kizuku Otsubo, Kokubunji; Toru Suyama, Tokorozawa, and Masanori Udagawa, Musashino, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed July 11, 1975, Ser. No. 595,146
Claims priority, application Japan, July 13, 1974, 49-82778[U]
Int. Cl.² F02D *5/04*
U.S. Cl. 123—117 A **7 Claims**



1. An ignition timing control system for an internal combustion engine including an induction passageway having a throttle valve rotatably mounted therein, said system comprising a vacuum motor adapted for controlling the ignition timing of said engine, first and second passage means adpated for providing communication between said vacuum motor and said induction passageway immediately upstream of the edge of said throttle valve in its fully closed position for applying vacuum in said induction passageway to said vacuum motor to operate it, said first passage means being located in parallel with said second passage means, and first and second bimetallic leaf valve means disposed respectively in said first and second passage means for closing and opening the corresponding passage means in accordance with the temperature of said engine to control vacuum application to said vacuum motor, said first leaf valve means being formed and constructed to have a thermal hysteresis characteristics in which said first leaf valve means, when in a first predetermined temperature range, alternatively closes and opens said first passage means in dependence on a temperature to which said first leaf valve means is cooled from a temperature higher than a temperature in said first predetermined temperature range, said second leaf valve means being formed and constructed to have a thermal hysteresis characteristics which is different from said thermal hyteresis charactertistics of said first leaf

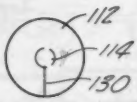
valve means and in which said second leaf valve means when in a second predetermined temperature range different from said first predetermined temperature range, alternatively closes and opens said second passage means in dependence on a temperature to which said second leaf valve means is cooled from a temperature higher than a temperature in said second predetermined temperature range.

4,027,634

VACUUM BREAK ASSEMBLY

Benjamin C. Benjamin, Flint, Mich., assignor to Schmelzer Corporation, Durand, Mich.

Filed Aug. 27, 1975, Ser. No. 608,102
Int. Cl.² F02M 1/10, 1/08
U.S. Cl. 123—119 F **8 Claims**



1. A vacuum break device for use with a carburetor choke of an internal combustion engine comprising: a housing including a pair of cup-shaped elements, a diaphragm disposed in sealing engagement with said cup-shaped elements and forming a control chamber in one of said cup-shaped elements at one side of said diaphragm, a stem connected to the other side of said diaphragm and adapted for connection to said choke for positioning the latter between a closed and open position upon movement of said diaphram, a wall member disposed in engagement with said one cup-shaped element in axially spaced relation to an end wall of said cup shaped element to form a circular filter chamber in said housing having a diameter substantially equal to the internal diameter of said one cup-shaped element, an air filter element disposed in said filter chamber, passage means between said control chamber and said filter chamber and including an opening in said wall member, valve means including an **O-ring** having one face in engagement with said wall and surrounding said opening, a valve closure element positioned for engagement with another face of said **O-ring**, an annular retaining element supported on said wall and having a smaller diameter than said filter chamber, first resilient means acting between one side of retaining element and said closure element to urge the latter into engagement with said **O-ring**, second resilient means acting between the other side of said retaining element and said diaphragm for urging the latter to a choke closed position, and vacuum inlet means communicating with said filter chamber and adapted for connection to a source of vacuum, said valve means being operative in the presence of vacuum pressure in said filter chamber to evacuate fluid from said control chamber at a restricted rate to move said diaphragm in a choke opening direction and being movable out of engagement with said O-ring in the absence of vacuum pressure in said filter chamber for free admission of air to said control chamber for return movement of said diaphragm to a choke closed position.

4,027,635

FLOW RATE CONTROL MECHANISM FOR USE IN EXHAUST GAS RE-CIRCULATING SYSTEM

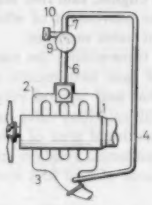
Kenji Goto; Norio Shibata, and Yukihide Hashiguchi, all of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyoda, Japan

Filed Apr. 8, 1975, Ser. No. 566,678
Claims priority, application Japan, Sept. 25, 1974, 49-110282
Int. Cl.² F02M 25/06
U.S. Cl. 123—119 A **6 Claims**

5. A flow rate control mechanism for an exhaust gas recirculating system in an internal combustion engine, said mechanism comprising:

means defining a swirl flow chamber having a circular cross-section and disposed in an intake system of the engine, said chamber having

a first inlet port for atmospheric air only, said first port opening into said chamber in a direction substantially tangential to the circular periphery of said chamber,



a second inlet port for exhaust gas located adjacent said first inlet port and in fluid communication with an exhaust manifold of the engine, said second port opening into said chamber in a direction substantially normal to the axis of the circular periphery of said chamber, and

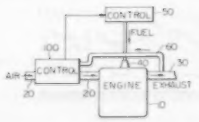
an outlet port in fluid communication with an intake manifold of the engine through which a mixture of the air and the exhaust gas is fed to the engine.

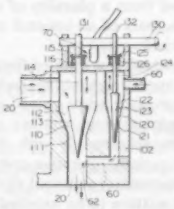
4,027,636

FLOW RATE CONTROL APPARATUS IN EXHAUST GAS RECIRCULATION SYSTEM

Tadahiro Yamamoto, Yokosuka, and Kenji Yoneda, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed May 14, 1976, Ser. No. 686,533
Claims priority, application Japan, May 26, 1975, 50-62648
Int. Cl.² F02M 25/06
U.S. Cl. 123—119 A **8 Claims**





1. In an interanl combustion engine having an exhaust gas recirculation passage which interconnects the exhaust line to the induction passage of the engine, apparatus for controlling the mass flow rate of the exhaust gas in the recirculation passage comprising:

a first venturi section formed in the induction passage to serve as a sonic nozzle;

a first valve member movably arranged in association with said first venturi section such that the effective cross-sectional area of said first venturi section is varied depending on the position of said first valve member;

a second venturi section formed in the exhaust gas recirculation passage to serve as a sonic nozzle;

a second valve member movably arranged in association with said second venturi section such that the effective cross-sectional area of said second venturi section is varied depending on the position of said second valve member;

first means for moving said first valve member to vary the flow rate of air through said first venturi section and vary the speed of the engine, said first means including a movable member the movement of which causes the movement of said first valve member;

second means for transmitting the movement of said movable member of said first means to said second valve member such that said second valve member moves simultaneously with said first valve member and varies the effective cross-sectional area of said second venturi section in a predetermined relation to the variation in the cross-sectional area of said first venturi section.

4,027,637

AIR-FUEL RATIO CONTROL SYSTEM FOR USE WITH INTERNAL COMBUSTION ENGINE

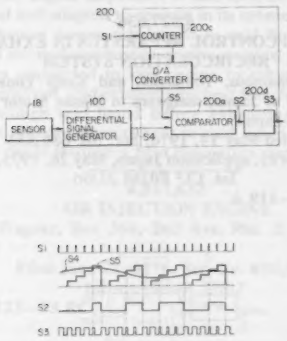
Shigeo Aono, Tokyo, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 11, 1975, Ser. No. 630,851

Claims priority, application Japan, Nov. 14, 1974, 49-131345; Mar. 7, 1975, 50-26961

Int. Cl.² F01N *3/00*

U.S. Cl. 123—119 D **9 Claims**



1. System for effectively reducing oxides of nitrogen in exhaust gases emitted from a plurality of sequentially operative combustion chambers of an internal combustion engine, which system comprises:

first means for generating a train of first pulses;

second means for receiving said first pulses to count and to group the same every predetermined number of said first pulses, said predetermined number of said first pulses being in a prime relationship with the number of said plurality of sequentially operative combustion chambers;

third means for generating a control signal indicative of an optimal air-fuel mixture to be supplied to the combustion chambers according to engine operating conditions;

fourth means for receiving both said control signal from said third means and said first pulses from said second means to generate a train of second pulses, each of said second pulses being generated within a time duration of said predetermined number of said first pulses in such a manner as to be modulated in width in dependence of said control signal;

fifth means for controlling a fuel supply to the combustion chambers, which receives the train of said second pulses to alternatively supply a rich and a lean air-fuel mixture to each of the combustion chambers according to each of said second pulses.

4,027,638

EXHAUST GAS RECIRCULATION DEVICE

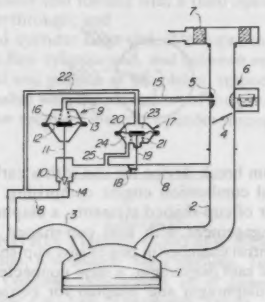
Hisanori Moriya, and Tadao Osawa, both of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Division of Ser. No. 405,899, Oct. 12, 1973. This application Jan. 13, 1976, Ser. No. 648,712

Claims priority, application Japan, Oct. 16, 1972, 47-102689

Int. Cl.² F02M *25/06*

U.S. Cl. 123—119 A **3 Claims**



1. An exhaust gas recirculation device for recirculating a part of exhaust gas discharged from the exhaust system to the downstream of the carburetor throttle valve through an exhaust recirculation passage for removing nitrogen oxides released from an internal combustion engine, characterized in that a pressure control valve is provided in the afterflow of a flow control valve disposed halfway in said exhaust recirculation passage for controlling the amount of exhaust gas recirculated to the downstream of said throttle valve, said pressure control valve being controlled such that its opening will be reduced when the negative pressure downstream of the throttle valve is high and that said opening will be enlarged when said negative pressure is low, means for operating the flow control valve by a signal proportional to air intake, wherein said flow control valve is controlled by negative pressure in the Venturi in the carburetor, and said pressure control valve is controlled by the difference between the pressure in the upstream of the flow control valve and the pressure between said pressure control valve and said flow valve.

4,027,639

ISOTHERMAL FUEL SUPPLY SYSTEM

Masuo Amano, Okazaki, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Continuation-in-part of Ser. No. 555,265, March 4, 1975, abandoned. This application June 23, 1975, Ser. No. 589,596

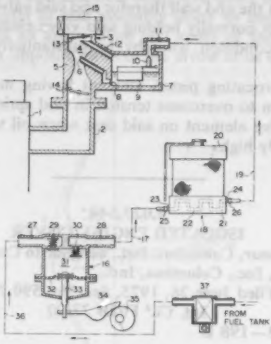
Claims priority, application Japan, Oct. 23, 1974, 49-122225

Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 E **1 Claim**

1. In an internal combustion engine which includes an isothermal fuel supply system which incorporates the engine's cooling water circulating system including the engine's radiator which contains a bottom tank portion located at its exit portion, said system further including a fuel pump, a fuel supply tube, and a carburetor or fuel injection device, said fuel supply tube extending from the fuel pump to the carburetor or the fuel injection device, the improvement which comprises

providing a substantial length of said fuel supply tube to extend through said bottom tank portion of the radiator in direct



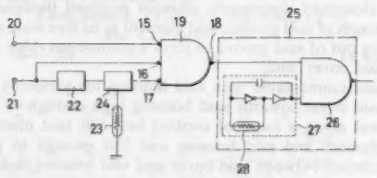
heat exchange contact with the cooling water in said tank portion.

4,027,640

AUTOMATIC CHOKE VALVE APPARATUS IN AN INTERNAL COMBUSTION ENGINE

Yoshiaki Hirosawa, Tokyo; Toshio Nomura, Niiza, and Masahiko Iiyama, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 15, 1975, Ser. No. 606,403
Int. Cl.² F02M *1/10*; F02D *11/08*
U.S. Cl. 123—179 G **6 Claims**



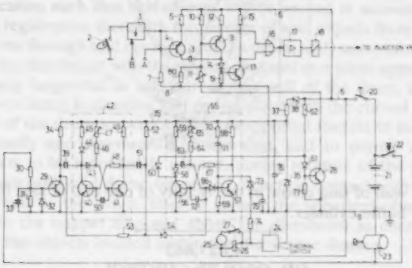
1. An automatic choke valve apparatus for an internal combustion engine comprising a choke valve mounted in an intake passage of an internal combustion engine, an operation shaft connected to said choke valve, an external pulse motor including a drive shaft, an intermediate torsion spring connecting said operation shaft and said drive shaft, coupling means between said shafts for imparting drive from said drive shaft to said operation shaft only in regular direction of rotation of the drive shaft, and a driving pulse circuit means connected to said pulse motor for driving the same from a position for engine starting to a position when engine firing is completed, said driving pulse circuit means comprising an electrical circuit having a first input sensitive to closure of an ignition switch, a second input sensitive to the beginning of completed engine firing, variable resistor means sensitive to engine temperature, and control means coupled to said inputs and resistor means for producing pulses for driving said pulse motor to move the choke valve in one direction from the engine starting position to the position at which completed engine firing is obtained, said pulses being produced by said circuit at a frequency and for a time period in accordance with the variable resistance of the resistor means whereby the choke valve is driven at a rate of speed and for a time interval related to engine temperature.

4,027,641

CONTROL APPARATUS FOR STARTING INTERNAL COMBUSTION ENGINES

Helmut Möder, Stuttgart, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Feb. 3, 1975, Ser. No. 546,670
Claims priority, application Germany, Mar. 2, 1974, 2410090
Int. Cl.² F02B *3/00*; F02D *1/04*
U.S. Cl. 123—179 L **8 Claims**



1. In a starting control apparatus of an internal combustion engine with especially electronically controlled fuel injection, said engine including an electric starter motor, a starting switch, fuel injection valves, said control apparatus including electronic circuit means for controlling the injection valves of the engine and further including an engine temperature sensor for providing an electrical signal to said circuit means for controlling the fuel injection process, the improvement comprising:

an electronic switch, connected in series with said temperature sensor for altering the electrical signal provided by said temperature sensor; and

a thermal switch, connected to operate said electronic switch; whereby said electronic switch causes the release of supplementary fuel to the internal combustion engine when said engine is at normal operating temperature, and said starter motor has been actuated for more than a predeterminded time.

4,027,642

INTAKE AIR HEATING DEVICE FOR USE IN INTERNAL COMBUSTION ENGINE

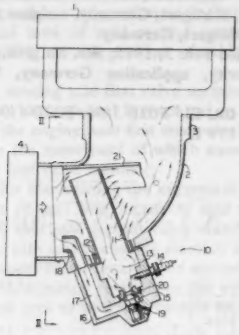
Naoki Kamada, Hitachi, and Nobutoshi Hasebe, Ibaraki, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 12, 1975, Ser. No. 603,791
Claims priority, application Japan, Aug. 14, 1974, 49-92373
Int. Cl.² F02M *31/00*
U.S. Cl. 123—122 G **7 Claims**

1. In an intake air heating device including means for introducing fuel from a tank disposed outside said device and injecting fuel into a combustion chamber; an electrically controlled ignition plug disposed in the vicinity of an injection nozzle for firing the fuel which has been thus injected into the combustion chamber; and a flame baffle cylinder for guiding combustion flames to an intake pipe leading to an engine; the improvements comprising;

said flame baffle cylinder piercing through the wall of an elbow from outside into the interior thereof, said elbow serving as part of an air intake pipe and,

means for guiding flames from said flame baffle cylinder to the intake pipe, said means being secured to the inner



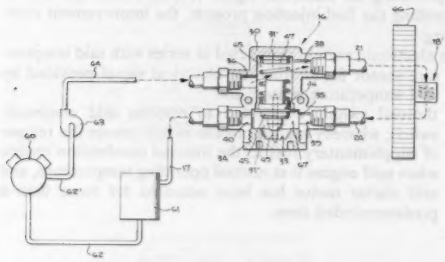
wall of said elbow in the vicinity of one end of said flame baffle cylinder.

4,027,643

OIL COOLER CONTROL

Patrick J. Feenan, 19123 Community St., Northridge, Calif. 91324, and Edward B. Walton, 3129 Yale Ave., Marina del Rey, Calif. 90291

Filed Aug. 14, 1975, Ser. No. 604,560
Int. Cl.² F01M *1/00*
U.S. Cl. 123—196 AB **6 Claims**



1. In a combustion engine temperature responsive system for passing lubricating oil from the combustion engine alternatively either directly back to the engine or through a cooling coil prior to return to the engine,

a valve device comprising a housing having a valve chamber therein,

an oil supply passage for oil from the engine to the chamber,

an oil return passage for oil from the chamber to the engine,

a cooling coil intake passage for oil from the chamber to the cooling coil and a cool oil discharge passage for oil from the cooling coil to the chamber,

said chamber having adjoining side wall structures of different diameters substantially cylindrically shaped at opposite ends, and end walls for the respective side wall structures,

an annular valve seat extending around an interior wall of said chamber at the junction of the side wall structure for one end with the side wall structure for the other end, whereby the portion of the valve seat of smallest diameter is no smaller than the diameter of the smaller of said side wall structures,

a valve member comprising a housing and a thermal responsive reciprocating piston element, said housing having an annular valve element thereon at the outermost perimeter in operable association with said seat,

said thermal responsive reciprocating piston element in said valve member having an operating engagement between said housing and said valve member and responsive to temperature changes in said oil,

resilient means in one of said side wall structures acting between the end wall therefor and said valve element in a direction normally holding said valve element in an unseated condition whereby to substantially bypass said coil,

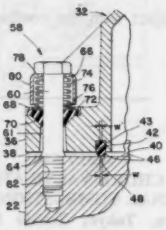
said reciprocating piston element having movement in a direction to overcome tension in said spring and to seat said valve element on said seat when oil temperature is relatively high.

4,027,644

ISOLATED ENGINE COVER

Sune E. Timour, Columbus, Ind., assignor to Cummins Engine Company, Inc., Columbus, Ind.

Filed June 26, 1975, Ser. No. 590,708
Int. Cl.² F02B *77/00*
U.S. Cl. 123—198 E **22 Claims**



1. In an interanl combustion engine having a housing, an anti-noise cover assembly comprising:

a cover adapted to be placed over said housing;

means forming a continuous perimeter groove on said cover, said groove facing towards said housing;

an elongated elastomeric element received thoughout the length of said groove; said element in its free state extending out of said groove to form a continuous ridge around said cover; and,

means connectable with said housing for yieldably urging said cover towards said housing high enough to form a seal along a band of contact between said elastomeric element and said housing and low enough to prevent contact between said cover and said housing, said cover being spaced from said housing;

whereby said cover is sound insulated with respect to said engine.

4,027,645

ARCHERY BOW WITH ARROW GUIDING DEVICE

William M. Damron, 458 S. 97th Place, Mesa, Ariz. 85208

Filed Nov. 24, 1975, Ser. No. 634,626
Int. Cl.² F41B *5/00*
U.S. Cl. 124—24 R **9 Claims**

5. A bow for guiding and launching archery arrows comprising:

a bow,

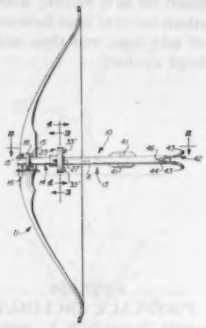
a bowstring tautly arranged between the ends of the bow, and

a bowstring positioning and launching tube assembly attached to the bow at its spine point for extending laterally of the longitudinal axis of the bow for positioning and manual removal of a bowstring therefrom for launching an arrow,

said assembly comprising a first hollow tubular portion attached to the bow at its spline point and a second hollow tubular portion coaxially aligned with and detachably connected to said first tubular portion and positioned

between the belly of the bow and the bowstring when the latter is in a neutral position,

the portions of said assembly being split along opposite ends of a diameter of said assembly along its length whereby the tips of an arrow head and some of the feathers at diagonally opposite parts of the arrow at its opposite end



protrude outwardly of the assembly through its slits for guiding of the arrow through the guiding and launching device, and

a finger guard means mounted along at least a part of the length of said assembly for protecting the archer's fingers from the protruding portions of an arrow passing through said assembly.

4,027,646

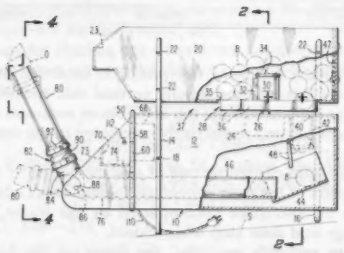
PROPULSION DEVICE FOR TENNIS BALLS AND LIKE SPHERICAL OBJECTS

Gerard F. Sweeton, Skillman, N.J., assignor to Prince Manufacturing, Inc., Princeton, N.J.

Filed June 8, 1976, Ser. No. 694,119

Int. Cl.² F41F *1/04*

U.S. Cl. 124—56 **14 Claims**



1. In a propulsion device for spherical objects, of the type including a discharge barrel, a communicating drum in which air pressure is built up behind each of said objects for propelling the same forcibly from the barrel, and a trap door normally closing an opening into said drum by air pressure within the drum, the improvement comprising: means mounting the trap door and defining said opening into said drum so that a spherical object fed into the drum through said opening will build up kinetic energy while in free fall vertically downwardly through said mounting means into the drum to an extent effective to momentarily bias the door to a substantially vertical open position while said object is still in free fall said trap door, in so opening, momentarily inhibiting free fall of the spherical object; and means within the drum to which said object, while regaining substantially free fall, will gravitate clear of the trap door, so as to permit an immediate return of the trap door to a closed position free of any restraint imposed thereon by the spherical object.

6. In a propulsion device for spherical objects of the type including a discharge barrel, a hopper for holding a quantity of said objects, a pressurized drum disposed below the hopper in communication with the barrel, and a rotating distributor for sequentially feeding said objects into the drum from the hopper, said drum having a curved top wall and said distributor having an annular series of feed sleeves carrying said objects into position to be fed into the drum, the improvement comprising: a feed opening formed in said top wall of the drum at a location such that said sleeves will be moved in succession into registration therewith for passage of said objects from the sleeves through said opening into the drum; and means mounting the distributor with the sleeves disposed in a plane approximately tangential to said curved top wall of the drum, said sleeves being bottomless and cooperating with the curved top wall of the drum to permit objects supported therein to move upwardly and downwardly therewithin, and to permit said objects to be individually rotated, during rotation of the distributor with said sleeve-supported objects in contact with the top wall of the drum, thus to agitate the spherical objects within the hopper disposed above the distributor in contact with the objects located within the distributor sleeves.

4,027,647

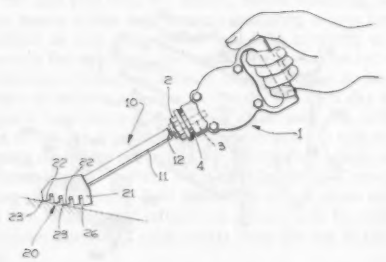
PLANING AND CUTTING TOOL

Herbert H. Hoffman, 598 G Avenida Majorca, Laguna Hills, Calif. 92653

Continuation-in-part of Ser. No. 487,916, July 12, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,725

Int. Cl.² B28D *1/22*

U.S. Cl. 125—6 **8 Claims**



1. A cutting tool having a forward end and a rear end and having means associated therewith for positioning a shank on the rear end thereof in force transmitting relation, said tool comprising:

a tool body having generally parallel and spaced cutting teeth means associated therewith for cutting into a workpiece under action of said tool, each cutting tooth having a cutting edge formed by the intersection of a forward face and a bottom face, each forward face being generally parallel with each other forward face and each bottom face being generally parallel with each other bottom face;

shank means for receiving power from a source of power;

means for connecting said shank means and said tool body in force transmitting relation; and

cutting disposal groove means between said cutting teeth means, said cutting disposal groove means being generally tapered from the center of the tooth to widen at the sides.

4,027,648

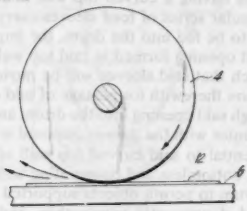
GRINDING WHEEL DRESSING METHOD

Phillip E. Bonnice, Worthington, Ohio, assignor to General Electric Company, Columbus, Ohio

Continuation of Ser. No. 535,018, Dec. 20, 1974, abandoned. This application Apr. 29, 1976, Ser. No. 681,603

Int. Cl.² B24B *53/04*

U.S. Cl. 125—11 R **7 Claims**



1. A method of dressing a bonded, rigid grinding wheel on a high speed grinding machine comprising the steps setting the wheel against a metal piece at substantially zero clearance, rotating the wheel at normal grinding speed of the machine, applying a wheel dressing slurry comprising a multiplicity of abrasive crystals dispersed in a normally fluid carrier medium to the moving surface of said grinding wheel by forcing said wheel dressing slurry through a conduit in a dressing shoe having a metal dressing face in substantially zero clearance to said wheel surface, whereby the dressing slurry is spread on the surface of the wheel, and abrading said wheel surface having said slurry spread thereon against said metal dressing face to remove selected portions of the surface of said wheel.

4,027,649

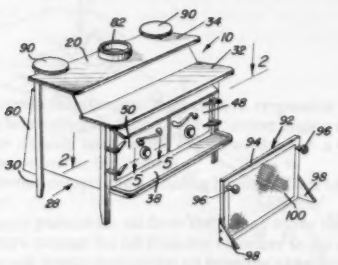
COMBINED WOOD BURNING STOVE AND FIREPLACE

J. D. Jackson, 38751 Camp Creek Road, Springfield, Oreg. 97477

Filed Oct. 30, 1975, Ser. No. 627,245

Int. Cl.² F24C *1/14, 15/36*

U.S. Cl. 126—4 **12 Claims**



1. A combined stove and fireplace assembly including a housing having interconnected opposite side, front, rear, and top and bottom walls, said front wall having a large opening formed therein whose upstanding side edges are spaced inwardly of said side walls, a pair of opposite side closure doors hingedly supported from opposite side portions of said front wall and swingable horizontally between coplanar positions closing said opening with their free swinging edges in close juxtaposition and open positions with said doors swung outwardly and rearwardly into position closely paralleling the outer surfaces of the forward portions of said side walls, a rear portion of said assembly having a flue outlet opening formed therein, said front wall including a horizontally outwardly projecting hearth spaced slightly below the lower marginal poertion of said large opening, an upright screen structure having front and rear sides and support legs including at least portions thereof spaced forward of the opposite side marginal portions of said screen structure, said screen structure, including said legs being removably positionable on said hearth with the periphery of said screen structure at least closely juxtaposition the outer surfaces of said front wall extending about said large opening, said hearth including a raised curb extending about its outer periphery, said curb including opposite end inwardly curving portions, said legs being closely embraced by said inwardly curving portions of said curb when said screen structure is disposed on said hearth, whereby said inwardly curving curb portions serve to limit forward displacement and lateral shifting of said legs, and thus said screen structure, relative to said large opening.

4,027,650

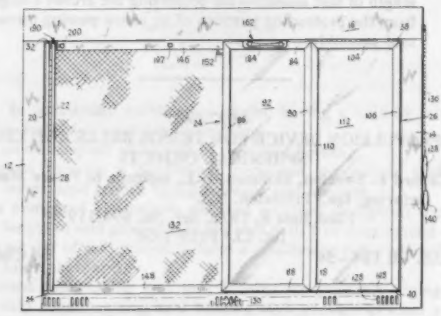
FIREPLACE ENCLOSURE

Harrison F. Edwards, Norwich, N.Y., assignor to Bennett-Ireland, Inc., Norwich, N.Y.

Filed Jan. 12, 1976, Ser. No. 648,387

Int. Cl.² F23M *7/00*

U.S. Cl. 126—140 **11 Claims**



1. A fireplace enclosure, comprising in combination:

a. a frame having substantially vertical side members and substantially horizontal top and bottom members extending between and respectively connected to the side members,

b. a door stop carried by one of said members,

c. two pairs of hingedly connected folding doors adapted to close off the space encompassed by the frame, and to engage said door stop when closed,

d. means movably mounting the doors on the frame for movement between open and closed positions,

e. an elongate handle movably carried by one of said doors,

f. means for slidably mounting said handle on the one door for lengthwise movement,

g. cooperable latch means on said one door and frame, responsive to movement of said handle for selectively latching the door to the frame and releasing the door therefrom,

h. said handle mounting means comprising a channel having a U-shaped cross-section, said channel being slidable along the top edge of said one door,

i. said cooperable latch means comprising a lug stamped out from said channel, and

j. means defining an aperture in the door stop for receiving said lug when said latch means is actuated,

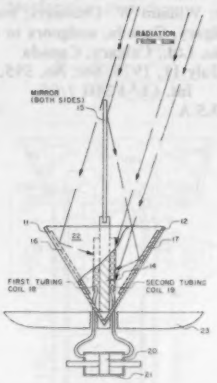
k. sliding of said handle effecting latching engagement of the lug and door stop.

4,027,651

SOLAR-ENERGY-POWERED SUN TRACKER

Roland W. Robbins, Jr., 825 E. California Blvd., Ridgecrest, Calif. 93555

Filed Feb. 17, 1976, Ser. No. 658,544
Int. Cl.² H24J 3/02; G01J 1/20
U.S. Cl. 126—270 **5 Claims**



1. Apparatus for aiming a rotatable solar energy collector constantly towards the sun comprising:

a housing open on one side;

a central divider mounted inside said housing so as to divide said housing into two compartments each open on said side;

a first mirror, in the first of said two compartments, mounted on said housing so as to face said divider;

a second mirror, in the second of said two compartments mounted on said housing so as to face said divider;

a first fluid containing reservoir mounted on one side of said divider and facing said first mirror;

a second fluid-containing reservoir mounted on the second side of said divider and facing said second mirror;

means for translating vapor pressure of said first and second reservoirs into movement of said apparatus and said collector whereby the vapor pressure provides the motive force for the movement; and

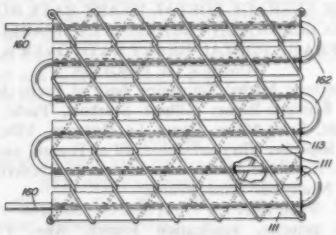
means for shading one of said two compartments from the sun when said central divider is not bore-sighted towards the sun.

4,027,652

SOLAR ENERGY COLLECTOR

Frank Collura, 2926 W. Jean St., Tampa, Fla. 33610

Filed Apr. 15, 1975, Ser. No. 568,188
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 **10 Claims**



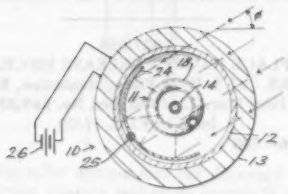
1. In a solar heater, a plurality of elongated side-by-side thin metal strips, a plurality of elongated cylindrical pipe sections underlying said strips and interconnected to define a continuous liquid flow path through said pipe sections, said metal strips being arched over and disposed in good heat transfer relation with the adjacent portions of said pipe sections opposing said strips, the arching of said strips being such as to closely conform to the radii of curvature of said adjacent pipe section portions and establish a wide area of good heat transfer relationship between said adjacent pipe section portions and said strips, a woven mesh fabric including crossed interwoven opposite side plies, said pipe sections paralleling said strips, said strips and pipe sections being interposed between the opposite side plies of said woven mesh fabric.

4,027,653

SOLAR ENERGY COLLECTOR

Gershon Meckler, 7425 Democracy Blvd., Unit 212, Bethesda, Md. 20034

Filed Oct. 10, 1975, Ser. No. 621,477
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 **3 Claims**



1. An improved solar energy collector for transferring solar energy from the sun to a fluid comprising, in combination, a solar energy heat absorber including tube means through which the fluid is circulated for transferring solar energy to the fluid, reflector means for directing solar energy from the sun to said heat absorber, said reflector means having a ferromagnetic portion, vacuum insulating means separating said heat absorber and said reflector means from the atmosphere for preventing conduction and convection heat losses from said collector and said reflector means, means mounting said reflector means within said vacuum insulating means for rotation about an axis along which said tube generally extends, and means for automatically positioning said reflector means for directing a maximum amount of solar energy to said heat absorber as the sun advances across the sky each day including means for rotating said reflector about such axis as the sun moves across the sky including means exterior to said vacuum insulating means for producing a magnetic field which attracts the ferromagnetic portion of said reflector and means for rotating such magnetic field producing means about said axis for in turn rotating said reflector about said axis for reflecting a maximum amount of solar energy from the sun to said tube means.

4,027,654

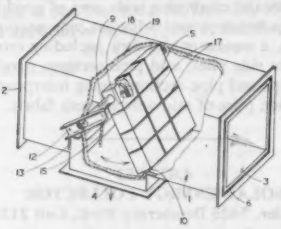
DAMPER ASSEMBLY FOR HIGH TEMPERATURE OR CORROSIVE GASES

David H. Kannapell, Prospect, Ky., assignor to American Air Filter Company, Inc., Louisville, Ky.

Filed Dec. 4, 1975, Ser. No. 637,720
Int. Cl.² F23L 3/00, 11/00, 13/04
U.S. Cl. 126—285 R **9 Claims**

1. A damper assembly comprising: a flow through housing having a flow through inlet and a flow through outlet; a pair of metallic plate members disposed within the housing and attached on opposite sides to a transversely extending movable support member having pressure relieving means therein, the support member extending through aligned openings in the sidewalls of the housing; said plate members including means for receiving refractory thereon; a refractory substantially

covering said plate members, said refractory being divided into a plurality of preselected sections; and, a material having a relatively low disintegrating temperature disposed between



adjacent sections of said refractory whereby upon initial heating of the assembly said low temperature disintegrating material disintegrates thereby leaving spacing in the refractory for expansion and contraction over a wide temperature range.

4,027,655

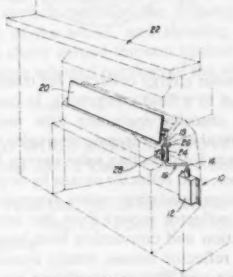
FIREPLACE DAMPER RELEASE MECHANISM

Erich J. Feldl, 227 S. Wind Place, Manhattan, Kans. 66502

Filed Mar. 22, 1976, Ser. No. 669,050

Int. Cl.² F23L *11/00*

U.S. Cl. 126—288 **5 Claims**



1. A fireplace damper release mechanism for automatically allowing a damper to close after a fire has gone out in a fireplace, the damper including a fireplace damper connecting rod having an upper end portion and a vertical lower end portion, the upper end portion of the rod attached to the damper, the damper opened and closed by manually raising and lowering the rod, the mechanism comprising:

a housing mounted in the fireplace for receiving the lower end portion of the rod;

a first temperature sensitive release means pivotally mounted in said housing, the bottom of the lower end portion of the rod disposed directly above said first release means and resting thereon, the rod holding the damper in an open position while starting a fire in the fireplace, said first release means flexing with an increase in temperature away from the bottom of the lower end portion of the rod thereby allowing the rod to drop downward; and

a second temperature sensitive release means pivotally mounted in said housing, said second release means constructed to flex more rapidly than said first release means when the temperature increases in the fireplace, said second release means positioned below the bottom and in a spaced relationship to one side of the lower end portion of the rod, said second release means flexing with an increase in temperature toward the center of the bottom of the lower end portion of the rod and directly below for receiving the rod thereon when the rod is released by said first release means;

said second release means flexing with a decrease in temperature when the fire is gone out in the fireplace and flexing away from the center of the bottom of the lower end portion of the rod thereby returning to its original position and allowing the rod to drop downwardly closing the fireplace damper.

4,027,656

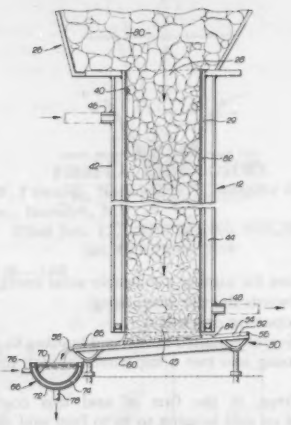
SULPHUR MELTING APPARATUS AND METHOD

Robert S. Geddes; William W. Chalmers, and Ross R. Williams, all of Calgary, Canada, assignors to Canadian Occidental Petroleum, Ltd., Calgary, Canada

Filed July 11, 1975, Ser. No. 595,329

Int. Cl.² F24H *1/00*

U.S. Cl. 126—343.5 A **15 Claims**



1. A sulfur melting apparatus comprising:

a substantially vertical tube for receiving solid sulfur at its upper end;

means for heating the inside wall of the tube so as to melt the sulfur in contact therewith;

said tube having a lower open end; and

an adjustable, heated plate externally positioned directly below the lower open end of the tube and defining a controlled restriction to prevent the flow of solid sulfur from the tube but allowing the flow of molten sulfur from the tube onto the plate, said plate having a top surface with opposing end rails and a rear rail enclosing three sides of said surface, said rails extending upward above the surface of said plate, said plate extending downward from the rear rail, the lower side of said plate being fitted with a heating means.

4,027,657

FOETAL HEART RATE APPARATUS AND METHOD IN WHICH AVERAGE FOETAL HEART RATE DURING NON-DECELERATION PERIODS IS COMPARED WITH THE AVERAGE FOETAL HEART RATE OVER A FEWER NUMBER OF PERIODS

Claude Sureau; Michel Tournaire, both of Paris; Jean-René Zorn, Bourg-la-Reine; Gilbert Sturbois, Paris; Jacques Chavinié, Saint-Maur; Roger Le Houezec, Villejuif, and André Ripoche, Vitry-sur-Seine, all of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, France

Filed Apr. 15, 1975, Ser. No. 568,160

Claims priority, application France, Apr. 17, 1974, 74.13270

Int. Cl.² A61B *5/04*

U.S. Cl. 128—2.06 F **17 Claims**

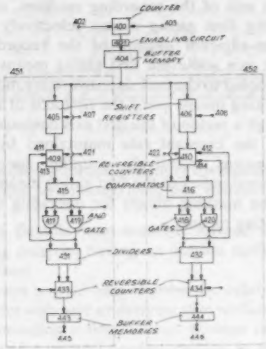
1. A method for quantitatively determining the decelerations of a foetal heart rate, comprising the following steps:

sensing the foetal heart rate and providing an electric heart rate signal;

forming from the heart rate signal a heart period signal comprising a pluraiity of heart beats;

forming from the heart period signal a signal corresponding to a filtered average value of the heart period over a given number of heartbeats;

inhibiting in the heart period signal the values corresponding to the deceleration periods;



forming, from the non-inhibited value, an average signal of a number of heart periods greater than said given number;

comparing the instantaneous values of the filtered value and of the average value;

integrating the difference signal between said average value and said filtered value in the case where the filtered value is greater than the average value.

4,027,658

INSTRUMENT FOR TAKING SAMPLES

Manly Ernest Marshall, 1824 Grove Ave., Richmond, Va. 23220

Filed Dec. 1, 1975, Ser. No. 636,570

Int. Cl.² A61B *10/00*

U.S. Cl. 128—2 W **9 Claims**

1. An instrument for taking samples comprising a stem, a head, and a handle wherein

said stem, head, and handle are formed of a single polymer material in a solid unitary construction, said head and handle being formed at opposed ends of said stem,

said stem is of a substantially constant diameter,

said stem is of a diameter such that it is flexible,

said head and handle are of diameters larger than said stem such that they are relatively inflexible,

said head is cylindrical and of a substantially constant diameter of less than 6 millimeters, and

said head has grooves formed therein for accepting samples.

4,027,659

RADIOGRAPHIC OPAQUE AND CONDUCTIVE STRIPPED MEDICAL TUBES

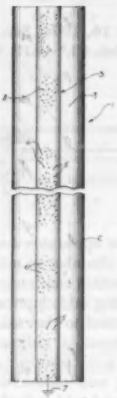
Eugene L. Slingluff, East Troy, Wis., assignor to Krandex Corporation, Milwaukee, Wis.

Filed Nov. 21, 1975, Ser. No. 634,075

Int. Cl.² A61M *25/00;* **F16L** *11/12*

U.S. Cl. 128—2 M **10 Claims**

1. A radiographic opaque and conductive medical tube comprising a tubular member formed of a flexible impervious plastic material and including a single integral stripe portion extending throughout the length of the tubular member, said stripe portion including a mixture of first material and a second material different than said first material, said first material being a highly conductive material, said second material



being a radiographic opaque material dispersed throughout the stripe portion whereby said single portion is operable for grounding of the tubular member to prevent significant electrostatic charge existing on the tubular member during use and simultaneously defines a visually observable portion of the tubular member when subjected to a radiographic beam.

4,027,660

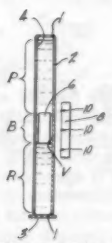
MATERIAL LAYER VOLUME DETERMINATION

Stephen Clark Wardlaw, 16 Pine Orchard Road, Branford, Conn. 06405; Robert Aaron Levine, 31 Pilgrim Lane, Guilford, Conn. 06437, and James Vincent Massey, III, 80 Driftwood Lane, Trumbull, Conn. 06610

Filed Apr. 2, 1976, Ser. No. 673,058

Int. Cl.² A61B *5/14*

U.S. Cl. 128—2 F **28 Claims**



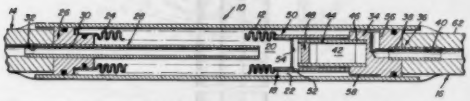
1. For use in measuring the approximate volume of a constituent material layer in a centrifuged material mixture having at least first and second adjacent material layers of different densities, an apparatus comprising: a tube the bore of which is of substantially constant diameter for containing the centrifuged material mixture; and a volume-occupying mass disposed within the bore in said tube, said mass comprising an axially elongated body formed of a resinous material which sinks through the layer of lesser density but is buoyant upon the layer of greater density, said body having an outside diameter which is sufficiently smaller than the tube bore diameter to form a free space means between said body and said tube bore operable to reduce the available free volume within said tube which substantially all of the layer of lesser density will

occupy to axially expand the extent of the layer of lesser density by a multiple of at least about four.

4,027,661
PRESSURE SENSOR

Warren Charles Lyon, Baltimore, and William H. Hayes, Jr., Woodbine, both of Md., assignors to Hittman Corporation, Columbia, Md.

Filed July 16, 1974, Ser. No. 488,988
Int. Cl.² A61B 5/00
U.S. Cl. 128—2 A 23 Claims

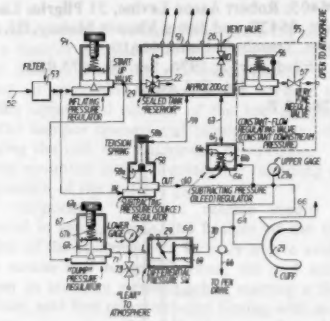


1. A pressure sensor apparatus comprising a housing, resilient means defining a chamber in said housing, a non-radioactive fluid contained within said chamber, pressure communication means for placing said chamber in communication with the pressure to be sensed so that said pressure will cause said resilient means to move, a radioactive material contained within said housing and radiation shielding means at least partially surrounding said radioactive material, one of said radioactive material and said radiation shielding means being operatively connected to said resilient means and moveable therewith, said radiation shielding means shielding said radioactive material as a function of the pressure acting upon said pressure communication means.

4,027,662
AUTOMATIC BLOOD PRESSURE RECORDER

Arnold S. J. Lee, Englewood, N.J., assignor to Milstein Medical Research Foundation, Inc., New York, N.Y.

Continuation of Ser. No. 378,167, July 11, 1973, abandoned.
This application Sept. 26, 1975, Ser. No. 617,175
Int. Cl.² A61B 5/02
U.S. Cl. 128—2.05 A 27 Claims

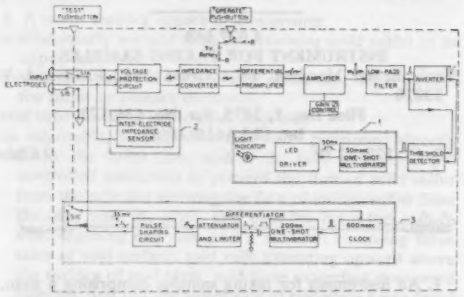


1. In an apparatus for automatically detecting and recording a succession of time-spaced blood flow surges occurring while a variable external pressure applied to a patient's artery is decreased over a first range including the systolic to diastolic pressure range of the patient, an inflatable cuff for applying the external pressure to the artery, normally unoperated means for pressurizing the cuff to a first predetermined value corresponding to the upper end of the first range, bleed valve means coupled to the cuff, means operative when the cuff has reached the first predetermined pressure value for depressurizing the cuff through the bleed valve means, control means including a portion of the depressurizing means and coupled to the bleed valve means and to the pressurizing means for maintaining said depressurizing at a specified constant rate throughout the first range, means for detecting successive blood flow surges caused by successive movements of the artery as the cuff is depressurized through the first range and for generating a succession of spaced first pulses corresponding to the successive detected surges, means coupled to the output of the detecting means for converting the successive first pulses into spaced, time-modulated second pulses having durations individually indicative of the time integral of the respective first pulses, a recording medium having a first axis, at least one marking means associated with and scannable along the first axis of the recording medium, each marking means including first gating means selectively operable to mark the then-adjacent portion of the recording medium along the first axis while the first gating means is operated, first means coupled to the cuff depressurizing means for scanning each marking means along the first axis of the recording medium through a region of the first axis corresponding to the first range at the constant rate maintained by the control means, and means selectively coupling successive time-modulated second pulses to the first gating means of at least a first one of the marking means for operating the last-mentioned first gating means.

4,027,663
HEART BEAT DETECTOR

Henryk Fischler; Yaakov Krupka, both of Rehovot, and Yacov Itzchak, Ramat Efal, all of Israel, assignors to Yeda Research & Development Co. Ltd., Rehovot, Israel

Filed Oct. 6, 1975, Ser. No. 620,224
Claims priority, application Israel, Oct. 4, 1974, 45786
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.06 R 5 Claims

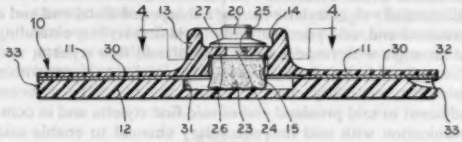


1. A heart-beat detector for continuously monitoring an ECG in emergencies and under adverse conditions, the detector comprising a pair of electrodes which are to be placed in contact with the body of a patient; circuit means coupled to said electrodes and responsive to signal output thereof for extracting QRS complexes and producing signals representative of occurrences of heart-beats; light generating means coupled to said circuit means and responsive to signal output thereof for producing a visible output representative of heart-beats even under adverse conditions of noise, vibrations, ambient light and the like; and means coupled to said electrodes and to said circuit means and responsive to impedance between said electrodes for producing a distinctive input signal to said circuit means upon said impedance exceeding a given level as an indication of too low a conductivity between said electrodes and the body of a patient, said circuit means further producing a distinct output signal upon the occurrence of said distinctive input signal, said light generating means being responsive to said distinct output signal from said circuit means indicative of the occurrence of said impedance exceeding said given value for providing a distinct visible output indicative thereof.

4,027,664
DIAGNOSTIC ELECTRODE ASSEMBLY WITH A SKIN PREPARATION SURFACE

Paul William Heavner, Jr., Kettering, Ohio, and Gregor Dean Long, Libertyville, Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Nov. 17, 1975, Ser. No. 632,740
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.06 E 8 Claims



1. A disposable electrode assembly for establishing an electrical connection to an underlying skin surface comprising, in combination:

a relatively flexible base member formed of electrically-insulating material having an outside surface and an inside surface;

contact means on said base member for establishing electrical contact with said underlying skin surface, said contact means including a first contact portion on said outside surface and a second contact portion in electrical communication with said first contact portion on said inside surface;

a cover member having an inside surface substantially coextensive with said inside surface of said base member, said cover member being, overall, substantially less flexible than the major extent of said base member and including a circumferential edge portion;

an adhesive layer on said inside surface of said base member holding said inside surface of said cover member against said inside surface of said base member so as to increase the rigidity of said electrode assembly during storage, said base member being peelable away from said cover member to enable said adhesive layer to be placed in contact with said underlying skin surface to hold said second contact portion in contact with said skin while said electrode assembly is in use; and

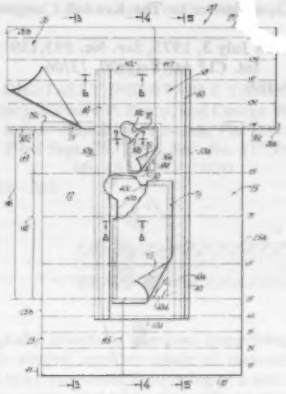
means including an abrasive surface on at least a portion of said circumferential edge portion of said cover member for use in preparing said underlying skin surface prior to application of said second contact portion thereto.

4,027,665
CARDIOVASCULAR DRAPE

George W. Scrivens, Edison, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Mar. 3, 1976, Ser. No. 663,900
Int. Cl.² A61B 19/06
U.S. Cl. 128—132 D 32 Claims

1. A surgical drape comprising a main sheet of flexible, drapable material, said main sheet having an upper surface, a lower surface, a top edge, a bottom edge, and a pair of opposed side edges, said main sheet having at least two fenestrations therein, each of said fenestrations being covered on the upper surface of the drape by a closure member comprising a thin flexible piece of polymeric film having upper and lower surfces, said closure members having adhered to their exposed lower surfces a coating of pressure sensitive adhesive, each of said adhesive coatings being protected, prior to use of the drape, by a removably adhered release covering; said main sheet having secured to its upper surface at least one retainer member made from a generally flexible material and comprising an elongated, open-ended conduit through which flexible

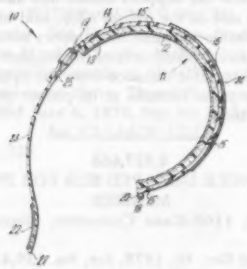


elements such as suction tubing and the like may be threaded and thereby retained in desired position on the drape.

4,027,666
SEMIRIGID COUNTERFORCE BRACE

Alvin J. Marx, 315 College Road, Bronx, N.Y. 10471

Filed Sept. 26, 1975, Ser. No. 617,144
Int. Cl.² A61F 13/00
U.S. Cl. 128—165 6 Claims



1. A counterforce brace adapted for application over a subject's forearm entirely below the elbow comprising semirigid curved backer sheet means having a plurality of perspiration eliminating apertures therein, the width of said backer sheet means being less than its length in the forearm circumferential direction, said circumferential length being the greater part of a subject's forearm circumference, a porous perspiration passing inner strip disposed about the inner surface of said backer sheet means, slot means formed within said backer sheet means at one end thereof, strap means attached to said semirigid curved backer sheet at said slot means at said one end of said backer sheet means, loop means integrally formed within said semirigid backer sheet means about the outer surface thereof near the other end of said semirigid backer sheet means, said loop being adapted to receive the other end of said strap means, and brace securing means comprising mating first and second portions, said first portion of said brace securing means being affixed to the outer surface of said strap means about the end thereof remote from said slot means and the second portion of said brace securing means being secured to the outer surface of said semirigid backer sheet means.

4,027,667
THERAPEUTIC STOCKING

Roger T. Swallow, Crystal Lake, Ill., and John E. Pendergrass, Seneca, S.C., assignors to The Kendall Company, Boston, Mass.

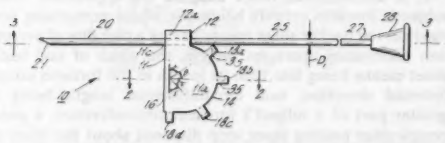
Filed July 3, 1975, Ser. No. 593,159
Int. Cl.² A61F *13/00, 13/06*
U.S. Cl. 128—165 **17 Claims**

1. A therapeutic stocking, comprising: a circumferentially elastic boot portion having an upper thigh panel for exerting a desired compressive pressure against the upper thigh of a wearer's leg, said upper thigh panel having a limited vertical stretch for accurate placement of the upper thigh panel on the wearer's upper thigh, waist support means, and a hip panel extending between the support means and said upper thigh panel along the side of the wearer's hip, said hip panel being vertically stretchable between the support means and upper thigh panel to permit placement of the support means on the wearer's waist a variable distance from the upper thigh while the upper thigh panel remains at its proper position on the wearer's upper thigh.

4,027,668
MULTI-ANGLE U-SHAPED HUB FOR INFUSION MEMBER

Allan R. Dunn, 1160 Kane Concourse, Miami Beach, Fla. 33154

Filed Dec. 10, 1975, Ser. No. 639,411
Int. Cl.² A61M *5/00, 25/02*
U.S. Cl. 128—214 R **16 Claims**



1. A hub for use with an infusion combination including a flexible infusion tube having a first end in fluid-flow connection with hollow infusion means and having a second end including means for forming another fluid-flow connection to an infusion supply, said hub comprising:

a hub member having a generally semicircular shape and having a protrusion radially extended away from its curved periphery;

a first portion of said flexible tube being secured through said hub protrusion;

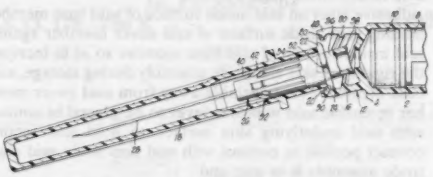
clip means integrally jointed to said hub member and positioned along its curved periphery at a location spaced from said hub protrusion for selectively receiving a second portion of said flexible tube intermediate said first portion and said second end to selectively maintain the axis of said flexible tube at a selected angular orientation relative to the axis of said hollow infusion means.

15. A styletto-catheter for use with medical infusion apparatus, comprising: a single lumen flexible catheter having a distal end and a proximal end, said proximal end including means for forming a fluid-flow connection with said medical infusion apparatus; said catheter having a first secondary channel formed in a first thickened wall portion of said catheter; a first substantially rigid stylette having a sharpened distal end and a proximal end, said proximal end of said first stylette extending at an angle with respect to the axis of said first stylette; said first stylette being closely received for axial movement within said first secondary channel; said catheter having a recess adjacent to said proximal end of said first stylette and in communication with said first secondary channel to enable said proximal end of said stylette to move between first and second positions to enable said distal end of said first stylette to be respectively extended beyond and retracted into the bore of the first and secondary channel and means for preventing said stylette from being removed from said first secondary channel.

4,027,669
DESTRUCTIBLE LUER LOCK SYRINGE AND METHOD OF DESTRUCTING SAME

Donald Leroy Johnston, Arcadia; Manuel Garfield Perkins, Gardena, and Lynn Zaugg Youngberg, Long Beach, all of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed Apr. 12, 1976, Ser. No. 676,232
Int. Cl.² A61M *5/00*
U.S. Cl. 128—218 N **18 Claims**



1. A destructible Luer lock syringe comprising: a barrel with a forward end; a needle adapter joined to the barrel's forward end, said adapter and forward end forming a unit having a fracturable section; and a laterally flexible needle retainer connected to the barrel and adapter combination, said needle retainer extending forwardly beyond the unit's fracturable section to a front end of the needle retainer, whereby the adapter and retainer can bend in a common lateral direction for fracturing this fracturable section.

4,027,670
CONTRACEPTIVE DEVICE

Emanuel H. Bronner, Box 28, Escondido, Calif. 92025

Filed Oct. 15, 1976, Ser. No. 732,800
Int. Cl.² A61M *31/00*
U.S. Cl. 128—261 **19 Claims**

1. A contraceptive device, comprising,

a contraceptive gel having a pH of less than b 3.0;

a delicate elongated inside sausage casing containing the

gel, and having a closed insertion end that will open to release the gel when the inside casing is squeezed;

a lubricant covering the inside casing at said insertion end;

a semi-sausage casing covering the lubricated insertion end of the inside casing for maintaining the lubricant in a lubricant state and at said insertion end, the semi-sausage casing having a closed end fitted over the inside casing near the longitudinal mid-portion of the inside casing; and

tear strip means having a first length removably attached to the semi-sausage casing near the open end of the semi-sausage casing and to the inside casing for hygenically sealing the lubricated insertion end of the inside casing and a second length attached to the semi-sausage casing to enable removal of the semi-sausage casing for exposing the lubricated insertion end of the inside sausage casing.

4,027,671

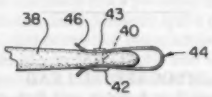
INSERTABLE DISPENSING CAPSULE

George S. Sperti, 1842 Madison Road, Cincinnati, Ohio 45206, and Norbert J. Berberich, Jr., 2550 Idlewild Road, Burlington, Ky. 41005

Continuation of Ser. No. 605,523, Aug. 18, 1975, abandoned, which is a continuation of Ser. No. 511,947, Oct. 4, 1974, abandoned, which is a continuation of Ser. No. 341,261, March 14, 1973, abandoned, which is a continuation of Ser. No. 82,742, Oct. 21, 1970, abandoned. This application June 18, 1976, Ser. No. 697,570

Int. Cl.² A61M *3/00*; A61J *3/07*

U.S. Cl. 128—272 **4 Claims**



1. A one piece tapered tubular dispensing capsule of substantially uniform wall thickness and having a smaller body orifice fitting end portion and a larger operating reservoir end portion for holding a medicament therein said smaller end portion being elongated and adapted for providing a means for dispensing said medicament therefrom, said elongated end portion having a wall rigidity sufficient to be insertable through a selected body orfice, said larger end constituting a means for expelling medicament to said elongated end portion comprising a bulb portion having a rigidity less than the rigidity of said body orifice fitting end to be deformable in response to external pressure wherein the medicament contained therein will be forced out of said elongated end portion upon application of said pressure to said bulb portion.

4,027,672

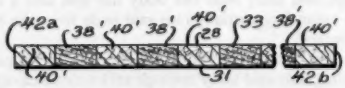
ABSORBENT ARTICLE WITH IMPROVED PAD AND METHOD

Hamzeh Karami, Crystal Lake, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Dec. 29, 1975, Ser. No. 644,691

Int. Cl.² A61F *13/16*; B32B *5/12*

U.S. Cl. 128—284 **21 Claims**



1. An absorbent article comprising, an absorbent pad assembly having a backing sheet of fluid impervious material, a top sheet, and an absorbent pad located intermediate the backing and top sheets and comprising a mass of fibers, said pad having densified regions for transmitting liquid through the pad at relatively high rates and for supporting the pad when placed under loads, and relatively undensified areas adjacent said regions providing a relatively high liquid holding capacity for the pad, with said regions having a thickness approximately at least as large as the thickness of said areas.

4,027,673

DIGITALLY INSERTABLE TAMPON

Mark P. Poncy; Richard P. Poncy, and George W. Poncy, all of 3660 E. Indus. Way, Riviera Beach, Fla. 33404

Filed Sept. 29, 1975, Ser. No. 617,497

Int. Cl.² A61F *13/20*

U.S. Cl. 128—285 **9 Claims**

1. A digitally insertable tampon comprising a generally cylindrically shaped member made of material adapted to absorb and store menstrual fluid being of a size and shape to function as a catamenial tampon, a cylindrical skirt attached to said cylinder extending from one end thereof to define an opening axially aligned with said cylinder, said opening being of a size and shape so that said skirt fits snugly around and surrounds a substantial portion of a human finger inserted fully into said opening and means for preventing menstral fluid from coming in contact with the inserted finger when the tampon in digitally inserted into the vagina comprising said skirt opening being of a sufficient depth for said skirt to cover a sufficient portion of said finger to avoid menstrual contact.

4,027,674

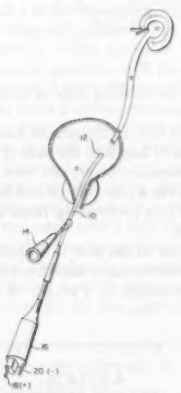
METHOD AND DEVICE FOR REMOVING CONCRETIONS WITHIN HUMAN DUCTS

Arthur N. Tessler, 566 First Ave., New York, N.Y. 10016; Gerd Lupke; Manfred Lupke, both of 221 Rayette Road, Concord, Ontario, Canada (L4K1C7), and Myron J. Tobias, 12 Dunsi mane Drive, Thornhill, Canada

Filed June 6, 1975, Ser. No. 584,672

Int. Cl.² A61B *17/22*

U.S. Cl. 128—328 **7 Claims**



1. Method for removing concretions within human ducts comprising:

A. generating a series of high voltage pulses of sufficiently low amperage to avoid harm to human tissues;

B. directing said pulses within an insulating medium extending into said ducts to the situs of said concretions; and

C. selectively discharging said pulses radially outwardly across the surface of said concretions; and

D. flowing a liquid peripherally of said discharging of pulses, so as to direct an hydroelectric impact against said concretions.

5. A device for removing concretions within human ducts comprising:

A. A flexible conduit of inert material extensible within said ducts to the situs of said concretions and including:

i. a flexible positive electrode extending coaxially within said conduit and being embedded in electrically insulative material; and

ii. a flexible negative electrode peripherally embedded in said conduit apart from said positive electrode and terminating at the outer end of said conduit, as a continuous electrically conductive surface encircling and coextensive with said positive electrode;

B. A liquid carrying outer annulus supported peripherally with respect to said flexible conduit of inert material, such that liquid may be delivered simultaneously and coextensively with said electrical discharges, as hydroelectric cavitation upon said concretions; and

C. a high voltage, low amperage pulse generating apparatus operatively connected to said positive electrode such that electrical discharges radiate from said positive electrode outwardly to said encircling negative electrode across the surface of said concretions.

4,027,675

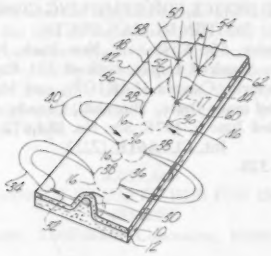
METHOD FOR IMPLANTING HAIR

Anthony S. Colone, 8580 Saratoga, Oak Park, Mich. 48237

Filed Oct. 17, 1975, Ser. No. 623,403

Int. Cl.² A61B *17/00*

U.S. Cl. 128—330 **9 Claims**



1. A method of implanting hair in living skin which comprises the steps of:

a. inserting a plurality of lengths of hair into living skin by passing lengths of hair into the skin at an entry point, then into the subcutaneous layer, and then out of the skin at an exit point to form a plurality of stitches and leave at least one length of hair protruding from each said entry and exit point; and

b. tying knots close to the skin in a plurality of pairs of such hair lengths wherein each such knot joins a length of hair from one such stitch to a length of hair from a second such stitch.

4,027,676

COATED SUTURES

Frank V. Mattei, Piscataway, N.J., assignor to Ethicon, Inc., Somerville, N.J.

Filed Jan. 7, 1975, Ser. No. 539,122

Int. Cl.² A61L *17/00*

U.S. Cl. 128—335.5 **17 Claims**

1. A finished multifilament absorbable surgical suture having improved tie down properties characterized in that the surface of the suture is coated with an absorbable composition providing in combination:

a. from about 10 to 50 percent by weight of an absorbable film forming polymer selected from the group consisting of homopolymers and copolymers of lactide and glycolide, copolymers of vinyl acetate with unsaturated carboxylic acids, water soluble or dispersible cellulose derivatives, natural gums, high molecular weight crystalline

ethylene oxide polymers, polyacrylamide, polyvinyl alcohol, polyvinyl pyrrolidone, gelatin, collagen, polyamino acids, and conjugated unsaturated triglycerides,

b. from about 20 to 60 percent by weight of an absorbable lubricant comprising a polyalkylene glycol having a molecular weight between about 5,000 and 200,000, and

c. from about 10 to 40 percent by weight of an absorbable hydrophobic material selected from the group consisting of higher fatty acids and esters of higher fatty acids.

4,027,677

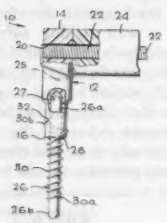
MYOCARDIAL LEAD

Joseph H. Schulman, Los Angeles, and Robert F. Moore, Oxnard, both of Calif., assignors to Pacesetter Systems, Inc., Sylmar, Calif.

Filed Jan. 9, 1976, Ser. No. 647,902

Int. Cl.² A61N *1/04*

U.S. Cl. 128—418 **12 Claims**



1. A myocardial lead for applying pulses to the myocardium, comprising:

an electrode body of an electrically conductive metal, characterized by relatively high stress fatigue and corrosion resistance properties, said body defining a longitudinal axis and top and bottom ends, a first cavity extending through said body near the body top end and a second cavity extending partially into said body from the bottom end thereof;

an electrode stud of electrically conductive metal partially extending into said body through said second cavity, with the stud portion extending beyond the electrode body bottom end defining an electrode pin, said stud being mechanically and electrically attached to said body;

a distal wire formed of a plurality of wire coils of an electrically conductive flexible metal, surrounded by a flexible sleeve with electrical insulating properties, said wire coils extending from a first end, adapted to be connected to a

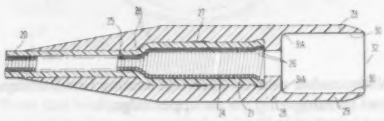
source of electrical pulses, to a second end, the coils extending into said body through the first cavity thereof, with portions of said coils up to said second end extending from said first cavity and being wrapped around said body and in mechanical and electrical contact therewith; and insulating means in contact with at least the electrode body portion around which said wire coils are wrapped for substantially electrically insulating the wire coils from said electrode pin, except through said body to which the coils and pin-forming stud are attached.

4,027,678

PACING SYSTEM WITH CONNECTOR FOR CONNECTING ELECTRODE TO PACER

Arie A. van Oostveen, Laag-Keppel, and Fred H. M. Wittkampf, Brummen, both of Netherlands, assignors to Vitatron Medical B.V., Dieren, Netherlands

Filed Nov. 19, 1975, Ser. No. 633,240
Int. Cl.² A61N *1/36*
U.S. Cl. 128—419 P **6 Claims**



1. A connector adapted for connecting a pacer to an electrode, where said electrode has a proximal end with a conductor prong of predetermined diameter and a casing of predetermined geometry, said connector being adapted at its distal end to connect to said proximal electrode end and at its proximal end to a pacer terminal, said connector comprising:

a. an inner coil extending through the length of said connector, said coil having at a distal portion an inside diameter just smaller than said conductor prong predetermined diameter, said coil further having several end turns of slightly larger diameter at said distal end, whereby entry of said electrode prong into said coil is facilitated;

b. an inner casing surrounding said coil, said casing extending substantially the length of said connector;

c. an outer casing around said inner casing at said connector distal end, said outer casing having a portion extending axially distal of the end of said coil, said extending portion having an opening with geometry substantially matching said predetermined electrode casing geometry;

d. proximal end means at the proximal end of said connector for providing mechanical and electrical connection of said coil to a pacer terminal; and

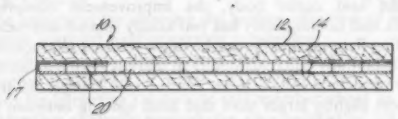
e. means for allowing rotation of said connector relative to said electrode in only one direction.

4,027,679

TOBACCO PRODUCT

Joseph Kaswan, 3092 14th St., Astoria, N.Y. 11102

Continuation-in-part of Ser. No. 534,478, Dec. 19, 1974, abandoned. This application Aug. 3, 1976, Ser. No. 711,218
Int. Cl.² A24D *1/00*
U.S. Cl. 131—9 **5 Claims**



1. A cigarette which comprises

a. a thin walled, hollow smoke vector, of ceramic or metal construction, extending longitudinally substantially the length of and disposed concentrically therewith so as to be surrounded by tobacco,

b. said vector comprising a substantially impervious hollow and empty cylindrical member having a substantially impervious closed mouth end and an open front end,

c. said vector establishing the heat removal sequence during a draw by collecting draw heat at the point of convergence inside the vector, creating the highest possible temperature differential between the open end of the vector and free air outside the vector, and removing heat by high velocity convection currents,

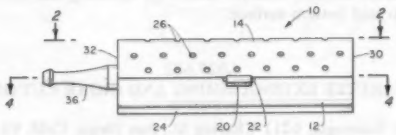
d. whereby the smoker draws in, during a puff, smoke comprising the products of the combustion of tobacco in systemic heat, below the formation temperatures of temperature dependant hazardous chemicals.

4,027,680

SAFETY CIGARETTE HOLDER AND ASH RETAINING DEVICE

Nicholas De Marco, 5011 Loyola St., Westminster, Calif. 92683

Filed Dec. 22, 1975, Ser. No. 643,503
Int. Cl.² A24D *1/12, 13/16*
U.S. Cl. 131—175 **1 Claim**



1. A cigarette holding device comprising:

a first member and a second member, said second member being integrally hingedly connected to said first member, said second member being movable between a closed position and an open position, said closed position being with said first members and said second members cooperating together to form a closed chamber, said open position permitting access to said closed chamber;

with said members in said closed position said members cooperating to form a forward end wall and a rear end wall, said forward end wall being closed, said rear end wall having a first opening therein, a cigarette supporting tip piece being mounted within said first opening, a cigarette being adapted to be placed within said tip piece and extend within said chamber in a cantilevered manner;

said first member being a solid unitary structure so as to function as a receptacle for the cigarette ash as the cigarette burns;

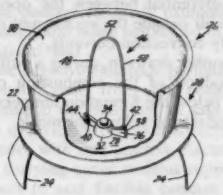
said second member having a plurality of openings therein to permit air to pass therethrough in order to facilitate burning of the cigarette; and

locking means interconnecting said first member and said second member when in the closed position so as to securely retain said first member and said second member in said closed position, said locking means includes a locking tab integrally formed upon said first member which is to connect with an enlarged bead on the said second member, said locking tab to biasingly engage said enlarged bead.

4,027,681
PIPE REAMER AND CAPTURE TRAY

Jackson D. Todd, 602 Berkley Drive, and Francis C. Yarger, 1107 Windsor Drive, both of Marion, Ind. 46952

Filed Oct. 28, 1975, Ser. No. 626,080
Int. Cl.² A24F *19/10*
U.S. Cl. 131—232 1 Claim

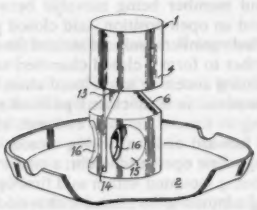


1. A pipe reamer-capture tray for cleaning a pipe bowl comprising:
a supportive tray having a bottom surface and upstanding peripheral walls for ash and dottle containment;
a single, unitary, elongated resilient loop element formed of relatively stiff wire having a pair of convexly curved side portions smoothly joined by an arcuate arch portion, said side portions having distal ends; said loop element lying in a loop-defined fixed plane; supporting means having said distal ends of said side portions secured thereto for supporting said element on said bottom surface of said tray in upstanding relationship therewith and in said loop-defined fixed plane whereby said side and arch portions resiliently conform to the inner surface of a pipe bowl for reaming the same upon insertion therein and application of downward rotative force thereon; and said supporting means comprises a member having said distal ends secured thereto, fastener means for securing said member to said bottom surface.

4,027,682
CIGARETTE EXTINGUISHING AND CIGAR CUTTING DEVICE

Victor Halmaghi, 6211 Charing St., San Diego, Calif. 92117

Filed Aug. 9, 1976, Ser. No. 712,435
Int. Cl.² A24F *13/24, 15/10*
U.S. Cl. 131—233 2 Claims

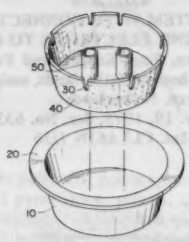


1. A cigarette extinguishing device which comprises:
a base;
a depressable stamper having a central cavity extending vertically from the bottom and a narrowed collar around the lower lip of the cavity;
a central shaft extending vertically from said base into said cavity having a flanged area around the top edge which has been force inserted past said narrow collar;
a coil spring in said cavity for holding said stamper apart from said base; and
a cigar cutter comprising:
a lateral section of the base having a generally horizontal hole, and a vertical slot having a slanted bottom perpendicularly intercepting said hole; and
a blade having a sharpened lower edge, fastened to the stamper and travelling into the slot.

4,027,683
DISPOSABLE ASHTRAY LINER AND MATING BOWL

J. Medley Lawbaugh, South Gate, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Nov. 28, 1975, Ser. No. 635,966
Int. Cl.² A24F *13/18, 19/14*
U.S. Cl. 131—235 R 5 Claims

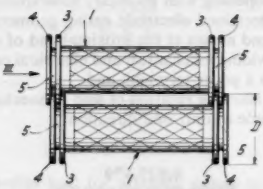


1. A disposable ashtray liner and mating bowl, comprising:
a bowl forming a lip on an upper edge,
a liner inserted in the bowl,
the liner forming a side that rises above the lip of the bowl forming a round bottomed slot, the bottom of the slot at the same level as the top of the tip,
the bottom of the liner forming a stub,
a cigarette snuffing insert attached to the stub, and the cigarette snuffing insert forming a hollow cylindrical depression in a top of the insert.

4,027,684
PERMANENT-WAVE OR WATER-WAVE CURLER

Siegfried Mueller, Max-Reger-Weg 3, 7737 Bad Buerrheim, Germany

Filed Nov. 10, 1975, Ser. No. 630,258
Claims priority, application Germany, Mar. 15, 1975, 7438190; Jan. 18, 1975, 2501935
Int. Cl.² A45P *2/00*
U.S. Cl. 132—40 10 Claims

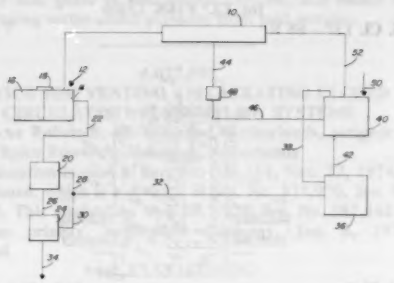


1. In a permanent-wave or water-wave curler having an elongated cylindrical curler body with at least one holding body, said holding body being arranged at one end coaxially of the curler body axis, said holding body being greater in diameter than said curler body, the improvement comprising wherein said holding body has two axially spaced and radially extending flanges, said flanges having a resilient characteristic and substantially equal diameters to thereby define an annular groove therebetween, at least one of said flanges having a thickness slightly larger than said axial spacing between said two flanges, whereby when said one flange is inserted under force into a groove of an adjacent curler, said flanges on said adjacent curler will flex to permit entry of said one flange therebetween and effect a friction holding of said one flange against a rotation relative to said two flanges defining said groove.

4,027,685
METHOD FOR PROCESSING USED EMULSION COOLANT

George E. Heard, Golden, and Thomas Buchanan McPherson, IV, Arvada, both of Colo., assignors to Coors Container Company, Golden, Colo.

Filed June 9, 1976, Ser. No. 694,283
Int. Cl.[2] C23G *1/02*
U.S. Cl. 134—10 12 Claims



1. A method of recovering used oil and water emulsion coolant from can bodies in a can making process and processing the coolant to form reconstituted emulsion coolant comprising:

washing emulsion coolant adhering to can bodies off of the can bodies with an aqueous solution having a pH less than about 5.0 thereby forming a mixture of the emulsion coolant and the aqueous solution,

heating the mixture to an elevated temperature sufficient to break a substantial portion of the emulsion coolant into a predominately hydrocarbon phase and a predominately aqueous phase said elevated temperature being at least 100° F,

settling the predominately aqueous phase from the predominately hydrocarbon phase,

separating the predominately hydrocarbon phase from the predominately aqueous phase,

adding a sufficient amount of water to the predominately hydrocarbon phase to reconstitute the emulsion coolant,

adding a sufficient amount of an emulsifying agent to the predominately hydrocarbon phase and the water to emulsify the predominately hydrocarbon phase and the water, and

filtering the predominately hydrocarbon phase, the water and the emulsifying agent to form reconstituted emulsion coolant.

4,027,686
METHOD AND APPARATUS FOR CLEANING THE SURFACE OF A SEMICONDUCTOR SLICE WITH A LIQUID SPRAY OF DE-IONIZED WATER

Samuel R. Shortes, Plano, and Edwin Graham Millis, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 2, 1973, Ser. No. 320,400
Int. Cl.[2] B08B *3/00*, *3/04*
U.S. Cl. 134—33 8 Claims

1. An apparatus for cleaning the surface of a slice of semiconductor material, said apparatus comprising:

a member providing a surface on which a slice of semiconductor material to be cleaned is adapted to be placed,

means for imparting rotation to said member about an axis extending centrally through the slice-supporting surface thereof,

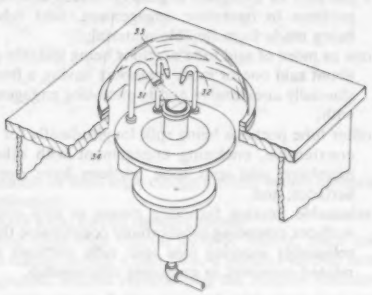
means for retaining the slice upon said slice-supporting surface of said member when rotary movement is imparted thereto,

means disposed in off-set relationsip to the level of said slice-supporting surface for dispensing a liquid spray onto the exposed surface of a slice positioned on said slice-supporting surface at a predetermined angular relationship with respect thereto,

said spray dispensing means including a spray nozzle disposed above the level of said slice-supporting surface, said nozzle having a spray-dispensing orifice therein so constructed as to produce a flat fan-shaped spray pattern for striking the exposed surface of a slice positioned on said slice-supporting surface with liquid spray along a linear path coinciding with the diameter of the slice, said nozzle being arranged in relation to the level of said slice-supporting surface to deliver the liquid spray at an angle lying within a range of 20° to 60° with respect to said slice-supporting surface.

a source of de-ionized water, said source of de-ionized water being operably connected to said nozzle such that de-ionized water is employed as the liquid spray to be dispensed from said nozzle onto the exposed surface of the semiconductor slice, and

control means for regulating the pressure and velocity of the liquid delivered by said nozzle against the exposed surface of the semiconductor slice supported on said slice-supporting surface to effect a cleaning operation thereon



removing particulate surface debris of a particle size smaller than the width of the theoretically determined dead space layer associated with the exposed slice surface.

5. A method of cleaning a surface of a slice of semiconductor material, said method comprising:

rotating the semiconductor slice about an axis extending through a central point thereof,

delivering de-ionized water as a liquid spray to a major surface of the semiconductor slice in a flat fan-shaped spray pattern striking the surface of the slice along a linear path coinciding with the diameter of the slice at a controlled pressure and velocity with the liquid spray striking the surface of the semiconductor slice at an angle lying within a range of 20° to 60° with respect thereto, and

regulating the pressure and velocity of the liquid spray within a predetermined range to produce a corona discharge in the region adjacent the surface of the semiconductor slice in response to the striking of the liquid spray against the surface of the semiconductor slice for effecting a cleaning action on the surface of the semiconductor slice removing particulate surface debris of a particle size smaller than the width of the dead space layer theoretically associated with the surface of the semiconductor slice.

4,027,687

PROTECTIVE AND/OR DECORATIVE COVER FOR WALKING AIDS

Malissa A. McGowan, 1502 E. 126th St., Compton, Calif. 90222

Filed Aug. 12, 1976, Ser. No. 713,671
Int. Cl.² B65D *65/08*; A45B *3/00*
U.S. Cl. 135—66 8 Claims

1. A protective and/or decorative cover for use with a walking aid which includes a load-supporting frame with a plurality of elongate angularly-related, intersecting leg, column and beam members, with one or more of said members having a free end, comprising:

a plurality of elongate, angularly-related intersecting tube portions in operative engagement, said tube portions being made from flexible material;

one or more of said tube portions being slidably engageable about said one or more members having a free end, substantially coextensive and in enclosing engagement therewith;

other tube portions being split longitudinally for substantial coextensive, enclosing engagement with others of said members, said split tube portions have opposed edge surfaces; and

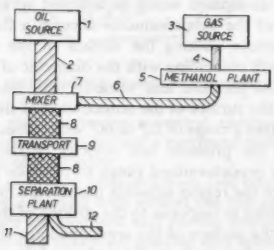
releasable, mating fastening means at said opposed edge surfaces extending substantially coextensive therewith for releasably securing said split tube portions about their related members in enclosing relationship.

4,027,688

TRANSPORTATION OF FOSSIL FUEL MATERIALS

Kurt Gruber, Monchengladbach; Willi Keim, Aachen-Walheim, and Klaus Hentschel, Aachen, all of Germany, assignors to Mannesmannrohren-Werke AG, Dusseldorf, Germany

Filed Jan. 22, 1975, Ser. No. 543,242
Claims priority, application Germany, Jan. 30, 1974, 2404326
Int. Cl.² F17D *1/16*
U.S. Cl. 137—13 10 Claims



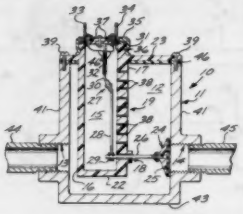
1. A process for the long-distance transport of fossil fuel material, in which a part of the fossil fuel material to be transported is converted into methanol before being transported, and is utilised as a transport medium in the fluid transport of the remainder of the material.

4,027,689

EXPLOSION RESISTANT ELECTRIC HEAT MOTOR GAS VALVE

Denis G. Wolfe, Santa Ana, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Apr. 21, 1976, Ser. No. 679,160
Int. Cl.² F16K *13/06*
U.S. Cl. 137—68 R 7 Claims



1. A gas value assembly comprising:

a. a housing enclosing a valve chamber and having inlet and outlet ports defined therein through which a combustible fluid enters and leaves said chamber;

b. an explosion resistant structure forming a separate compartment within said chamber and through which an access aperture is defined;

c. closure means operatively associated with one of the aforesaid ports;

d. mechanical linkage means extending from within said compartment through said access aperture to said closure means;

e. heat sensitive actuating means located within said compartment and connected to said mechanical linkage means, and

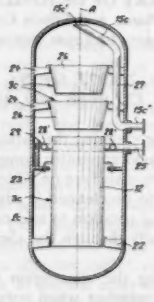
f. an electrical resistance coil located within said compartment and proximately positioned with respect to said heat sensitive actuating means.

4,027,690

GRAVITY-TYPE STEAM ACCUMULATOR

Georg Beckmann, Vienna, Austria, assignor to Siempelkamp Giesserei KG, Krefeld, Germany

Filed Aug. 14, 1975, Ser. No. 604,810
Claims priority, application Austria, Aug. 14, 1974, 6642/74
Int. Cl.² F22B *35/00*
U.S. Cl. 137—154 1 Claim



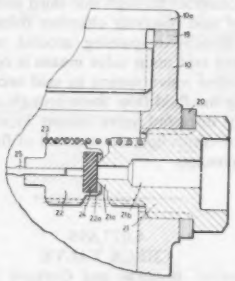
1. A steam accumulator comprising:

a vertically elongated vessel,
means for withdrawing steam from the upper end of said vessel;
a guide in said vessel subdividing same into a central downflow column and an annular upflow column surrounding said downflow column, said downflow column being of greater hydraulic diameter than said upflow column, said guide including at least one generally frustoconical downwardly tapered tube in said vessel; and
a plurality of upwardly directed nozzles in said vessel outside said guide in said upflow column, and means for spraying water under pressure from said nozzles.

4,027,691
DEVICE FOR VENTING AND AERATING CLOSED CIRCULATORY WATER FLOW SYSTEMS

Franciscus Roffelsen, NL Helmond, Netherlands, assignor to N.V. Spiro Research, Helmond, Netherlands

Continuation-in-part of Ser. No. 526,314, Nov. 22, 1974, abandoned, which is a division of Ser. No. 321,970, Jan. 8, 1973. This application May 28, 1975, Ser. No. 581,662
Claims priority, application Germany, Jan. 8, 1972, 2200904
Int. Cl.² F16K *45/02*
U.S. Cl. 137—202 **7 Claims**



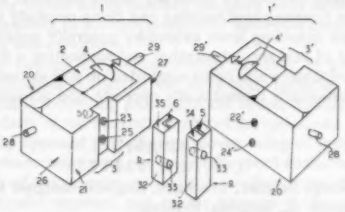
1. A vent valve for use in venting devices for closed water flow systems, wherein the valve is arranged on a vent casing which defines an air collecting chamber, said vent casing being connected to a horizontal conduit of the system and extending upwardly therefrom, said valve being capable of establishing communication between said chamber and the outside, the opening and closing of the valve being float-controlled in response to the water level in the casing, said valve consisting of an exteriorly threaded cylindrical valve body with an axially extending flow passage, a first axial extension on said valve body having a smaller diameter than the valve body proper, and having a plane end surface forming a valve seat surrounding said passage, an exteriorly threaded cylindrical closure body of the same diameter as said valve body and having a second axial extension of smaller diameter than said closure body and forming a plane end surface, and a spring engaging in the threads of said exteriorly threaded valve body and closure body and urging the plane end surface of said second extension against said valve seat in a rest position of said valve, said closure body being rotatable relative to said valve body whereby tension of said spring may be adjusted and operating limits of said valve may be preset, wherein said float being connected to said closure body at a point remote from said valve seat and wherein said axially extending flow passage of said valve is arranged to release collected gases outside of said vent casing when said valve is opened.

3. A valve for use in providing flow control of a fluid system, said valve consisting of:
an exteriorly threaded cylindrical valve body with an axially extending flow passage, a first axial extension on said valve body having a smaller diameter than the valve body proper, and having a plane end surface forming a valve seat surrounding said passage, an exteriorly threaded cylindrical closure body of the same diameter as said valve body and having a second axial extension of smaller diameter than said closure body and forming a plane end surface, and a spring engging in the threads of said exteriorly threaded valve body and closure body and urging the plane end surface of said second extension against said valve set in a rest position, said closure body being rotatable relative to said valve body whereby tension on said spring may be adjusted and the operating limits of said valve may be preset.

4,027,692
SYSTEM ALLOWING THE REALIZATION OF LOGIC CIRCUITS BY JUXTAPOSITION OF PNEUMATIC ELEMENTS

Daniel Bouteille, Marnes la Coquette; Pierre Hardouin, Asnieres, and Andre Thomasse, Cocherel, all of France, assignors to La Telemecanique Electrique, France

Filed Mar. 17, 1975, Ser. No. 559,356
Claims priority, application France, Apr. 1, 1974, 74.11546
Int. Cl.² F15C *3/00*; F16K *37/00*
U.S. Cl. 137—270 **6 Claims**



1. An assembly of fluid logic circuit module means comprising, in combination:
i. a first fluid logic circuit module means
ii. a second fluid logic circuit module means, each said module means having a first face, a parallel second face, and a graphic symbol representing the module function, said module means being disposed with their first and second faces parallel, said module means defining between them a recess into which there open fluid passages in the module means,
iii. a selecting unit disposed in said recess and cooperating with said module means, said selecting unit including:
a. at least one connecting channel
b. a graphic symbol on a face of the unit, said selecting unit and said recess being shaped and dimensioned such that said selecting unit may adopt each of two positions in said recess, in each of which positions the connecting channel connects fluid passages of the module means in a respective manner, and in each of which positions the graphic symbol of the unit is presented adjacent the graphic symbol of the module means to indicate the manner of connection of the passages.

4,027,693
FLOAT CONTROLLED VALVES

Martin C. Thompson, Maidstone, England, assignor to Reed International Limited, London, England

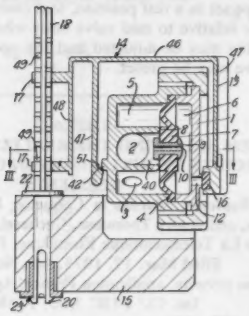
Filed Apr. 25, 1975, Ser. No. 571,660
Int. Cl.² F16K *31/18*
U.S. Cl. 137—414 **5 Claims**

1. A float-controlled valve comprising:
a valve housing defining inlet and outlet ports,
a flexible diaphragm supported in said housing and dividing said housing into an inlet chamber and a back-pressure

chamber which communicate with each other through a small port,

a valve member carried by said diaphragm for selectively permitting flow between said inlet and outlet ports,

a pilot valve controlling an outlet port in said back-pressure chamber,



a shroud member of generally semi-cylindrical configuration covering said housing and being pivotally mounted, and an actuating lever extending generally parallel to the axis of said shroud member and supporting a float,

said pilot valve also being supported on said shroud member substantially diametrically opposite said actuating lever.

4,027,694

CONTROL VALVE

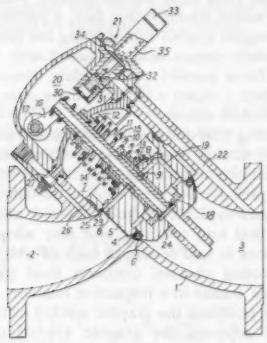
Alan George Butcher, Bracknell, England, assignor to Dresser Europe S. A., Brussels, Belgium

Filed Sept. 30, 1974, Ser. No. 510,864

Claims priority, application United Kingdom, Oct. 4, 1973, 46503/73

Int. Cl.² F16K *31/143*

U.S. Cl. 137—495 **4 Claims**



1. A pilot-operated fluid control valve comprising:

a valve body having a main flow passage therethrough with a main valve seat therein dividing said flow passage into upstream and downstream portions, said valve body further having a control chamber therein connected by a first passage to said upstream side of said flow passage, and a reservoir chamber separated from said control chamber and connected by a second passage to said downstream side of said flow passage;

main valve means sealed within said control chamber, subject to fluid pressure within said control chamber and movably fitted against said valve seat for seating in said valve seat and separating the upstream and downstream portions in response to pressure in said control chamber, whereby said valve is opened and closed, said main valve means having a third passage therethrough connecting said upstream side of said flow stream to said control chamber;

control rod means fitted through said main valve means and through said third passage therein for moving said main valve means toward and away from said valve set, said control rod means having a longitudinal opening therethrough for forming a fourth passage between said third passage connected to said control chamber and said reservoir chamber;

first control valve means operatively connected to said control rod means and positioned in said third passage for controlling fluid flow through said third passage in response to movement of said control rod means, whereby when said control rod means is positioned to open said main valve means said first control valve means closes said third passage;

second control valve means operatively positioned at the end of said fourth passage through said control rod means adjacent said main valve means for controlling fluid flow through said fourth passage in response to movement of said control rod means, whereby when said main valve means is open said second control valve means is open and fluid entering said control chamber through said first passage may flow from said control chamber to said reservoir chamber through said third and fourth passages and out of said reservoir chamber through said second passage, thereby by-passing around said main valve means when said main valve means is open;

auxiliary control valve means in said second passage for controlling the fluid flow therethrough; and

mechanically operated valve means located in said first passage for controlling the amount of fluid flow through said first passage.

4,027,695

CHECK VALVE

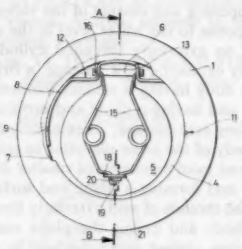
Hans Schnatmeyer, Bremen, and Gerhard Schützer, Stuhr-Moordeich, both of Germany, assignors to Gustav F. Gerdts KG, Bremen, Germany

Filed May 10, 1976, Ser. No. 684,706

Claims priority, application Germany, July 4, 1975, 2529910

Int. Cl.² F16K *15/03*

U.S. Cl. 137—527 **8 Claims**



1. A check valve controlled by the medium passing through comprising:

a valve housing (1) having an inner surface defining an inlet channel (2) and discharge channel (4) communicative with said inlet channel and joined thereto by a radially inwardly directed shoulder which defines a valve seat (3), said discharge channel having a circumferential receiving groove (7) formed therein;

a locking member (5) disposed over the inlet channel and positioned interiorly thereof adjacent said valve seat and including means for pivotably mounting said locking

member (6) for cooperative engagement with said valve seat; and

a generally C-chaped resilient mounting yoke (8) disposed substantially within said receiving groove of said discharge channel and in biased engagement therewith, said yoke extending over an annular arc of more than 180°, and having two radially-inwardly extending bend portions (12) formed therein adjacent its central portion which define two opposed shank segments (13), said shank segments having lateral recesses (14) formed therein for receiving the pivotable mounting means of said locking member.

4,027,696

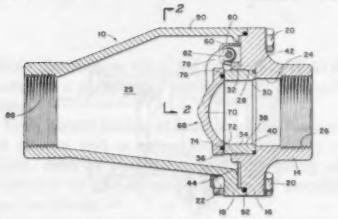
CHECK VALVE

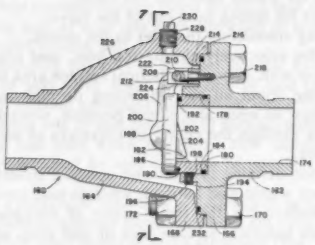
Glen B. Guyton, 3401 E. Newton, Tulsa, Okla. 74115

Division of Ser. No. 415,742, Nov. 14, 1973, Pat. No. 3,934,608. This application May 21, 1975, Ser. No. 579,469

Int. Cl.² F16K *15/03*

U.S. Cl. 137—527.4 **1 Claim**





1. A check valve comprising a first housing member having an inlet port, a second housing member removably secured to said first housing and having an outlet port in substantial longitudinal alignment with the inlet port, a sleeve member removably secured in said first housing member in alignment with the inlet port and having one end thereof extending into the second housing member for providing a valve seat, hanger means removably secured to the first housing member, clapper means removably secured to the hanger means and pivotal in directions toward and away from the valve seat to provide alternate closed and open positions for the valve, and compensating means provided on said hanger means for constantly urging the clapper means in a direction toward the valve seat in a manner to compensate for substantially any dimensional variances in the clapper member and valve seat, and wherein the hanger means comprises bar means removably secured to the first housing member, outwardly extending boss means provided on said bar means and having aligned elongated apertures provided therein for receiving the clapper means, said apertures being angularly disposed with a slope in the direction toward the valve seat to provide said compensation means for compensation of dimensional variances.

4,027,697

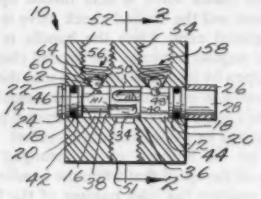
ROTARY VALVE

Roland W. Bonney, R.F.D. No. 1, Box 65, Kennebunkport, Maine 04046

Filed Nov. 19, 1975, Ser. No. 633,559

Int. Cl.² F16K *11/00*

U.S. Cl. 137—596 **2 Claims**



1. A rotary valve, comprising:

a housing having means defining a throughbore;

a valve body member rotatably received in the throughbore;

an operating handle secured on and forming part of the valve body member axially beyond the throughbore;

retaining means acting between the valve body member and the housing to prevent substantial axial movement of the valve body member;

a spool defined on the valve body member at an axially intermediate portion of the valve body member;

four axially extending grooves in the spool, equally spaced angularly of the outer periphery of the spool, one diametrically opposed pair of the grooves being of equal area, communicating with one end of the spool and terminating short of the opposite end of the spool and the other diametrically opposed pair of the grooves being of equal area, communicating with the opposite end of the spool and terminating short of the one end of the spool;

two respective circumferential seal ring means sealing between the valve body member and the housing throughbore distally of the one end of the spool and distally of the other end of the spool;

at least one of the valve body member and the housing being circumferentially relieved within the throughbore at two sites, one between said sealing ring means and said one end of the spool, and another between said sealing ring means and said other end of the spool to provide a first and a second respective chambers;

an inlet passage communicating with the spool through the housing intermediate the axial extent of the spool;

an outlet passage communicating with the spool through the housing intermediate the axial extent of the spool at a site disposed about one-quarter of the way angularly of the spool from where the inlet passage communicates with the spool;

a first auxiliary passage communicating with the first chamber through the housing; and

a second auxiliary passage communicating with the second chamber through the housing;

a normally closed check valve interposed in the first auxiliary passage, said check valve disposed to open away from the first chamber;

a cam mounted on the valve body member and disposed to forcibly open the check valve when the valve body member is rotated to a respective angular position;

a stop provided on the valve body member;

two stops provided on the housing for engagement by said valve body member stop when the operating handle is rotated in two respectively angularly opposed senses, to limit rotation of the valve body member to substantially a quarter turn, the stops defining the clockwise and counterclockwise extremes of rotation, and a neutral position being defined angularly centrally of these two extremes;

a second normally closed check valve interposed in the

second auxiliary passage, said check valve disposed to open away from the first chamber;

a cam mounted on the valve body member and dispcsed to forcibly open the second check valve when the valve body member is rotated to a second respective angular position;

the two stops on the housing being so positioned that when the handle is rotated to one angular extreme, the first-described check valve is held forced open by its associated cam and the second check valve is undisturbed by its associated cam, when the handle is rotated to the opposite angular extreme, the second check valve is held forced open by its associated cam and the first-described check valve is undisturbed by its associated cam, and when the handle is rotated to its neutral position, neither cam disturbs its associated check valve;

the stops on the housing are so arranged relative to the grooves on the spool that when the handle is rotated to its neutral position the inlet passage of the housing is communicated to one groove of each of said pairs;

the following tabulation summarizing operation of the valve when the operating handle is in each of said three positions thereof:

a. when the handle is in the neutral position thereof:

one groove of said one pair connects the inlet passage with the outlet passage and connects the inlet passage with the other groove of said one pair;

one groove of said other pair connects the inlet passage with said second chamber and with the other groove of said other pair;

the other groove of said one pair connects with said first chamber;

the other groove of said other pair connects said second chamber with said outlet passage; neither cam is forcing open a check valve, whereby fluid flow in at the inlet passage is divided, part passing from said one groove of said one pair to said outlet passage, and the remainder passing from said one groove of said other pair to said second chamber and to said other groove of said other pair then to said outlet passage;

b. when the handle is rotated 45° clockwise from said neutral position thereof:

said one groove of said one pair connects said inlet passage with said first chamber;

said one groove of said other pair connects with said second chamber;

said other groove of said one pair connects with said first chamber;

said other groove of said other pair connects said second chamber with said outlet passage;

said first cam is inactive;

said second cam is forcing said second check valve to remain open,

whereby, fluid pressure may open said first check valve and permit flow from said inlet passage, through said one groove of said one pair, through said first chamber, through said first check valve and into said first additional passage, and said second additional passage and said other groove of said other passage and said other groove of said other pair may drain through said second check valve, through said second chamber and through said other groove of said other pair, to said outlet passage; and

c. when the handle is rotated 45° counterclockwise from said neutral position thereof:

said one groove of said one pair connects said first chamber with said outlet passage;

said one groove of said other pair connects said inlet passage with said second chamber;

said other groove of said one pair connects with said first chamber;

said other groove of said other pair connects with said second chamber;

said first cam is forcing said first check valve to remain open;

said second cam is inactive,

whereby, said first additional passage and said other groove of said one pair may drain through said first check valve, through said first chamber and through said one groove of said one pair to said outlet passage, and fluid pressure may open said second check valve and permit flow from said inlet passage, through said one groove of said other pair, through said second chamber, through said second check valve and into said second additional passage.

4,027,698

VALVE WITH GENERALLY SPHERICAL CLOSURE MEMBER

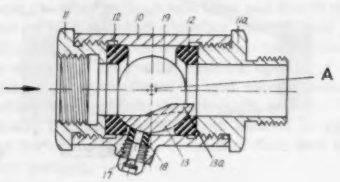
Karl Weinhold, Im Jagdfeld 43, 4040 Neuss, Germany

Filed Jan. 6, 1975, Ser. No. 539,152

Claims priority, application Germany, Jan. 12, 1974, 2401459; May 30, 1974, 2426065

Int. Cl.² F16K *11/02*

U.S. Cl. 137—625.22 **14 Claims**



1. A valve including:

an inlet for letting fluid into the valve;

an outlet for letting fluid out of the valve;

a housing connecting the inlet to the outlet;

a plug for selectively closing the inlet, said plug having a portion with a convex spherical surface area thereon and rotating about an axis extending through said housing between an open and closed position, wherein said axis passes through the center of curvature of said spherical surface;

means for defining at least one concave spherical sealing surface within said housing, wherein said convex spherical surface has the same center of curvature, as said convex spherical surface area of said plug, and wherein said concave and convex spherical surfaces cooperate to close said inlet, when said plug is rotated to said closed position;

a U-shaped cut-out extending through said plug, and defining an opening adjacent to said convex spherical surface for registering said inlet with outlet, when said plug is rotated to said open position, said U-shaped cut-out extending radially with respect to said axis;

a vent opening for venting said outlet and extending through said housing, said opening having a sealing sleeve therein with an entry surface thereon having a concave spherical surface which conforms to and engages the convex spherical surface of the plug, when the plug is in the open position;

said convex spherical surface area of said plug being sufficiently large to said inlet opening, when said plug is rotated to the closed position and sufficiently limited to uncover said vent when said plug is rotated to the closed position; and

a projection extending up from the bottom of the "U-shaped" cut-out, wherein said projection has a groove therein extending normal to the axis of rotation of the plug, said groove registering with said vent opening, and said projection engaging the concave entry of said sleeve

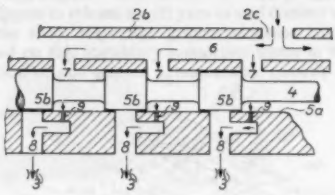
positioned in said opening, when said convex spherical surface closes said inlet opening.

4,027,699

FLUID DISTRIBUTION VALVE

Leif Andersson, and Ritindar Singh, both of Finspong, Sweden, assignors to Stal-Laval Turbin AB, Finspong, Sweden

Filed Sept. 29, 1975, Ser. No. 617,558
Claims priority, application Sweden, Oct. 2, 1974, 7412379
Int. Cl.² F16K *11/07*
U.S. Cl. 137—625.37 **4 Claims**



1. A fluid distribution valve for controlling fluid flow from a fluid source to a plurality of parallel fluid demand locations, comprising:

valve body means having at least one inlet for connection to said source and a corresponding plurality of parallel outlets, each of said parallel outlets being adapted for connection to one of said plurality of parallel fluid demand locations;

a corresponding plurality of valve elements selectively positionable within said valve body means to simultaneously open or close a corresponding plurality of parallel, large-flow fluid communication paths through said valve body between said at least one inlet and each of said plurality of parallel outlets; and

a corresponding plurality of parallel throttle by-passes located in said valve body, each one of said plurality of parallel throttle by-passes respectively connecting a corresponding one of said plurality of parallel outlets to said at least one inlet when said large flow communication paths are closed by said plurality of parallel valve elements;

whereby a maximum fluid flow is established to said plurality of parallel demand locations when said valve elements are in their open position; and a minimum flow, when said valve elements are in their closed position.

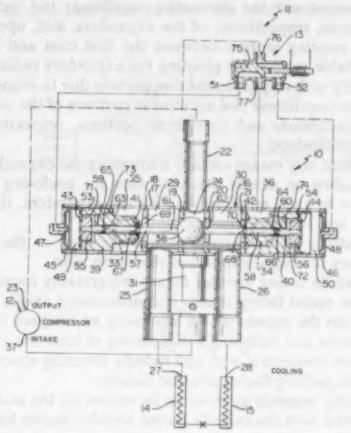
4,027,700

REVERSING VALVE CONSTRUCTION

Charles H. Perkins, Newtown Square, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Apr. 1, 1976, Ser. No. 672,607
Int. Cl.² F16K *11/00*
U.S. Cl. 137—625.66 **7 Claims**

1. In a reversing valve construction having a housing means provided with a pair of valve seats and a pair of valve members for respectively opening and closing said valve seats, a single pneumatically operated movable part carried by said housing means and being operatively associated with said valve members for sequentially moving the same to their closed positions against their respective valve seats when said movable part is moved in one direction a certain amount, said movable part comprising a flexible diaphragm, said pair of valve seats being in aligned relation, said valve members being in aligned relation and each including a piston portion disposed in engagement with said flexible diaphragm, the improvement wherein said diaphragm causes relative movement between said piston portions to provide for said sequential closing of said valve seats.

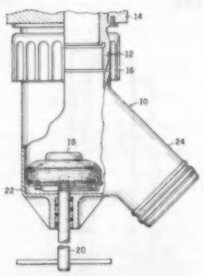


4,027,701

AIRCRAFT LAVATORY DRAIN PLUG

Milton Donald Duckworth, Jr., 1316 Orchard Lakes, St. Louis, Mo. 63141

Continuation-in-part of Ser. No. 530,679, Dec. 9, 1974, Pat. No. 3,954,123. This application Dec. 29, 1975, Ser. No. 645,232
Int. Cl.² F16L *35/00*
U.S. Cl. 137—800 **1 Claim**



1. In combination with a valve of the type attachable to an aircraft alvatory drain port, the valve being generally tubular and axially alignable with the port and having a lateral outlet integratedly formed therewith, the valve including means for engaging a port plug to move the plug into and out of engagement with the port, the improvement comprising the port plug including:

a. a base plate;

b. a first cam mounted on the base plate in fixed relationship therewith;

c. radially expandable means connected for relative rotatable relationship with the first cam, the radially expandable means including:

i. a disc portion; and

ii. radial exanders pivotally mounted on the disc, each of the expanders including a radially inwardly facing peripheral surface being generally annular and having alternate curvilinear and rectilinear portions;

d. radially outwardly facing peripheral surface means on the first cam being generally annular and having alternate curvilinear and rectilinear portions for cooperating engagement with the alternative curvilinear and rectilinear portions, respectively, of the expanders, and, upon relative rotating motion between the first cam and the expandable means, for pivoting the expanders radially outwardly with respect to the disc portion due to engagement of the curvilinear and rectilinear portions of the cam with the rectilinear and curvilinear portions, respectively, of the expanders;

e. resilient seal means radially embracing the expanders and including an axially extended face for enclosing an airspace in axial relationship with the expanders; the resilient seal means including:

i. radially facing annular means mounted on the expanders for radial expansion therewith; and

ii. axially facing annular means integratedly formed with the radial facing means and maintained axially spaced from the expanders for enclosing an airspace therebetween and including a disc having at least one convolution concentric with and radially inwardly spaced from the radially facing annular means;

f. radially inwardly protruding lip means on the seal means formed with the radially facing annular means for securing the resilient seal means into engagement with the radially expandable means;

g. a second cam mounted on the base plate in relative rotatable relationship therewith; and

h. locking means mounted on the base plate for outward slidable radial extension thereof with respect to the base plate into locking engagement with the port upon rotation of the second cam.

4,027,702

LOOM REED

Frank C. Sherrill, Greensboro, N.C., assignor to The Ellison Company, Inc., Greensboro, N.C.

Filed Apr. 21, 1976, Ser. No. 678,969

Int. Cl.² D03D *49/62*

U.S. Cl. 139—192 **1 Claim**

1. An improved loom reed of the type having an upper and lower backing strip extending transversely in parallel relation across the width of a loom and secured in a loom by means of set screws which extend from the lay, impinge upon, and bring pressure to bear against the outer surface of the lower backing strip, said loom reed comprising:

a. a plurality of spaced, parallel dent wires extending vertically between said upper and lower transversely extending backing strips, the lower ends of said dents being secured in spaced relation by cementitious material;

b. at least the lower of said backing members comprising a U-shaped member having a pair of spaced upstanding legs intergrally formed with a vertically enthickened lower force absorbing portion;

c. said pair of spaced upstanding legs of said U-shaped member overlying and receiving the lower, cementitious material filled ends of said dent wires, and the upper surface of the lower, force absorbing portion of said U-shaped member abutting against the lower ends of said dents and the vertically enthickened portion providing a force absorbing surface against which said set screws impinge.

4,027,703

SHUTTLELESS WEAVING MACHINE, ESPECIALLY RIBBON LOOM

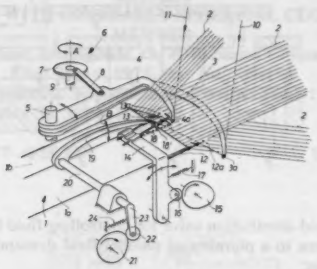
Ferdinand Diesner, Murg, Hanner, Baden, Germany, assignor to Jakob Muller, Forschungs-und Finanz AG, Frick, Switzerland

Filed Oct. 16, 1975, Ser. No. 623,074

Claims priority, application Switzerland, Oct. 16, 1974, 13884/74

Int. Cl.² D03D *47/42*

U.S. Cl. 139—431 **8 Claims**



1. A shuttleless weaving machine for weaving a fabric ribbon from weft threads and auxiliary threads, comprising at least one weft insertion element, at least one selvedge knitting needle having a hook, means for driving said selvedge knitting needle to-and-fro along a knitted selvedge edge of the fabric ribbon which is located opposite the weft insertion element for the formation of the knitted selvedge edge by knitting the inserted weft thread to the previously inserted weft thread or the auxiliary thread, a pivotable deflection element operatively associated with the selvedge knitting needle for controlled deflection of the weft thread or the weft thread and the auxiliary thread, into a knitting zone of the hook of the selvedge knitting needle, means for to-and-fro motion of the deflection element, an actuation element, means for driving the actuation element in cycle with the operation of said knitting needle and said deflection element so as to engage said deflection element for displacement thereof transversely with respect to the latter's direction of movement from a rest position into an operative position for acting on one of said threads or to deflect the latter into the knitting zone of the knitting needle hook.

4,027,704

METHOD AND DEVICE FOR DUMMY SHUTTLE OPERATION ON CONVENTIONAL SHUTTLE LOOMS

Bruno Romanin, Milan, Italy, assignor to Campagnie des Brevets et Applications Industrielles Etablissement, Liechtenstein

Continuation-in-part of Ser. No. 480,105, June 17, 1974, abandoned. This application Nov. 7, 1975, Ser. No. 630,026

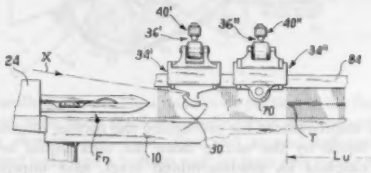
Claims priority, application Italy, July 6, 1973, 26285/73; Mar. 25, 1974, 8408/74

Int. Cl.² D03D *47/24*

U.S. Cl. 139—438 **4 Claims**

1. A device for converting a shuttle loom, including a stationary supporting frame, a cyclically oscillatable slay mounted on the frame, slay oscillating means, a heald assembly cyclically opening sheds of the warp yarns, a weft yarn carring shuttle carried by the slay and reciprocable thereon in a shuttle path extending parallel to the axis of oscillation of the slay, and shuttle boxes and pickers at opposite ends of the slay for

receiving the shuttle and reciprocating the shuttle through open sheds, into a dummy shuttle loom without modification of the operation of the shuttle loom in oscillating the slay, in operating the heald assembly, and in reciprocating a shuttle through open sheds by operation of the shuttle boxes and pickers, said device comprising, in combination, a dummy shuttle reciprocable along said slay, having a transverse dimension substantially equal to that of said first-mentioned shuttle and braking surfaces engageable with said shuttle boxes, operatively cooperable with said shuttle boxes and pickers, formed with a longitudinal groove to receive weft yarn guides, and provided, adjacent each end, with releasable weft yarn grippers operable to grip a weft yarn as said dummy shuttle enters the shed; respective gripper actuators mounted on said slay adjacent each end thereof and operable to actuate said grippers to release a weft yarn as said dummy shuttle exits from the shed; respective gripper actuator control means mounted on said stationary supporting frame in the paths of oscillation of said gripper actuators and directly engageable



with said gripper actuators, to actuate said grippers to release a weft yarn, responsive solely to oscillatory motion of said slay relative to said stationary frame and reciprocation of said dummy shuttle along said slay; respective mounting means mounting the gripper actuators adjacent each end of said slay, said mounting means being displaceable vertically relative to said slay; said control means comprising cam means operable to engage said mounting means during slay movement through a predetermined arc of its oscillatory motion in each direction; resilient means biasing each mounting means upwardly to an inoperative position of respective gripper actuator mounted thereon; a respective cam means engaging means articulated on each mounting means for operation by said cam means, to lower the associated mounting means, responsive to engagement of said cam means engaging means only when said slay is moving in one predetermined direction, said cam means engaging means, when engaged with said cam means during movement of said slay in the opposite direction, being displaced to an inoperative position.

4,027,705

STRAND-BRAKING APPARATUS

Petr Safar; Josef Langr; Miloslav Kolar, and Stanislav Nosek, all of Usti nad Orlici, Czechoslovakia, assignors to Vyzkumny Ustav Bavlnarsky, Usti nad Orlici, Czechoslovakia

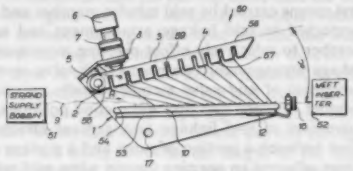
Filed Apr. 8, 1976, Ser. No. 675,183

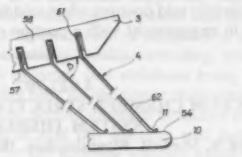
Claims priority, application Czechoslovakia, Apr. 16, 1975, 2617/75

Int. Cl.² D03D *47/34*

U.S. Cl. 139—450 **9 Claims**

1. In an apparatus for applying a braking force to a strand advanceable along a prescribed first path, a support frame, a guide plate carried by a lower portion of the frame and having an upper surface extending along the first direction adjacent the strand, an elongated holding member pivoted at one end to an upper portion of the frame, means for urging the holding member into a position oblique to the guide plate with the distance between the lower surface of the holding member and the upper surface of the guide plate increasing in the direction of advance of the strand, a plurality of resilient arms having upper ends individually supported by the holding member at longitudinally spaced intervals therealong, the successive resilient arms extending downwardly and forwardly toward the upper surface of the guide plate at progressively increasing angles to the holding member and terminable at their lower ends in substantial alignment with the upper surface of the guide plate to force the intervening portion of the





strand against the guide plate, and means for selectively pivoting the holding member downwardly toward the guide plate against the force of the urging means to vary the differential contact pressure of the successive resilient arms against the guide plate through the intervening strand.

4,027,706

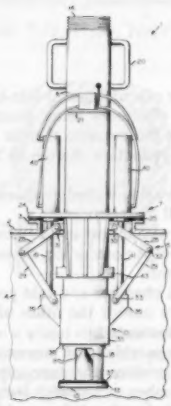
LIQUID DISPENSING AND VAPOR RECOVERY SYSTEM

James R. Stephens, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 13, 1975, Ser. No. 631,581

Int. Cl.² B65B *3/18*

U.S. Cl. 141—301 **7 Claims**



1. An apparatus for dispensing of liquids through an opening of a container, said apparatus comprising:

a. a tubular member having first and second ends, said second end being closed and having an aperture through a side wall of said tubular member;

b. a valve member slidably mounted on the exterior of a portion of said tubular member and axially movable thereon between a first position opening said aperture and a second position closing said aperture, said tubular

member portion and valve member being adapted to be received in a container for use;

c. a linkage arrangement carried by said tubular member and pivotally connected to said valve member for pivotal movement relative thereto;

d. first means carried by said tubular member and operably connected to said linkage arrangement and said valve member to selectively effect pivoting movement of said linkage arrangement relative to said valve member and movement of said valve member axially on said tubular member between said first and second positions, wherein movement of said linkage arrangement effects engagement between a portion of same and a portion of a container adjacent an opening therein when said valve member is in the first position; and

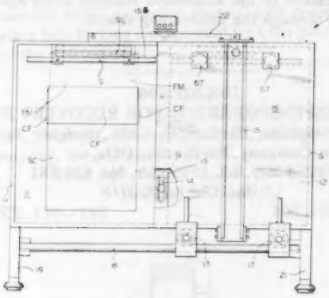
e. first seal means mounted on said tubular member and adapted to sealingly engage a portion of said container adjacent said opening when said link arrangement portion is in engagement with a portion of said container.

4,027,707

VACUUM CHAMBER STRUCTURE AND CONTROL SYSTEM THEREFOR

Richard N. Maskell, Bloomingdale, Ill., assignor to Container Corporation of America, Chicago, Ill.

Filed May 14, 1976, Ser. No. 686,285
Int. Cl.² B65B *31/02*
U.S. Cl. 141—66 **7 Claims**



1. In a system for evacuating two side-by-side walled chambers, one of such chambers being arranged for evacuation while the other has the pressure therein restored to ambient pressure following reduction therein to a pressure less than ambient:

a. a pair of side-by-side walled evacuation chambers having a common wall therebetween;

b. a passageway with a port in said common wall and connected selectively to one or the other of said walled evacuation chambers;

c. a closure for a chamber and said port movable between positions where one or the other of said chambers and said port are connected;

d. circuit means operable upon movement of said closure to either closing position for connecting said port and its connected chamber to a source for reducing pressure in said connected chamber below ambient.

4,027,708

DISPENSING NOZZLE CONTROL SYSTEM

William B. Hansel, Media, Pa., assignor to Suntech, Inc., St. Davids, Pa.

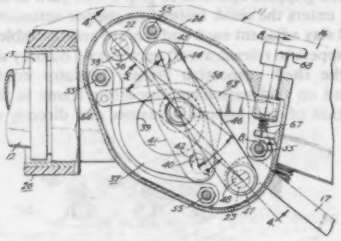
Filed Apr. 1, 1976, Ser. No. 672,580
Int. Cl.² B65B *1/36*
U.S. Cl. 141—209 **9 Claims**

1. In a dispensing nozzle for filling a tank with a liquid, and having,

a. a nozzle valve,

b. means for actuating the nozzle valve into an open or a closed position; and

c. automatic shut-off means, responsive to the liquid in the tank reaching a predetermined level, for placing the actuating means in a disabled condition wherein the nozzle valve cannot be actuated, said shut-off means having an enabling mode wherein the actuating means can actuate the nozzle valve and a disabling mode wherein the actuating means cannot actuate the nozzle valve;



an improvement for preventing the further dispensing of liquid by the nozzle once the tank liquid level has reached its predetermined level, said improvement comprising:

d. means, responsive to the automatic shut-off means obtaining its disabling mode, for maintaining the actuating means in the disabled condition so that the nozzle valve cannot be actuated by the actuating means; and

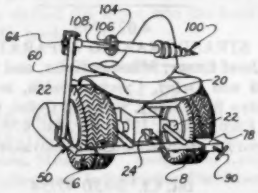
e. means for resetting the maintaining means to its normal position wherein further dispensing of liquid is permitted until the automatic shut-off means and the maintaining means is actuated again.

4,027,709

TRACTOR MOUNTED LOG SPLITTER

Russell H. Thackery, 2376 Brentwood Road, Columbus, Ohio 43209

Filed Apr. 19, 1976, Ser. No. 678,352
Int. Cl.² A47J *49/02*; **B27L** *7/00*
U.S. Cl. 144—193 R **14 Claims**



1. A tractor mounted log splitter comprising, in combination, a tractor comprising a tractor frame, driven wheels including hubs, wheel discs removably mounted on said hubs, and a plurality of fixed and removable threaded wheel fasteners on each of said hubs; a log splitting tool removably mounted on one of said wheels and including an inner mounting plate provided with mounting holes that register with said threaded wheel fasteners whereby said mounting plate can be removably mounted on said hub by said fixed threaded wheel fastenrs; and tractor lifting and support means comprising a transverse mounting portion removably mounted on the rear of said tractor frame, and a ground engaging portion extending downwardly from said mounting portion and forwardly to

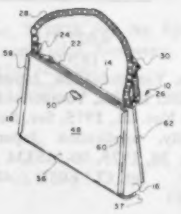
a position below the level of one of said tractor wheels and adjacent said log splitting tool.

4,027,710

CONVERTIBLE HANDBAG

EveLynne Marie Keebler, 11 Poplar Ave., Merchantville, N.J. 08109

Filed July 15, 1976, Ser. No. 705,527
Int. Cl.² A45C 3/06
U.S. Cl. 150—28 A **5 Claims**



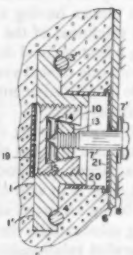
1. A handbag comprising a main body portion in the form of a bag, said main body portion including first and second substantially vertical side walls, first and second substantially vertical end walls and a bottom wall; at least one facing member, said facing member having one end secured to said bottom wall and being moveable between a first position wherein said facing member covers said first side wall and a second position wherein said facing member covers said second side wall, said facing member being of a size such that it covers only one of said side walls at a time and means for selectively securing said facing member to either one of said first and second side walls.

4,027,711

MEANS FOR MOUNTING CONCRETE STRUCTURAL MEMBERS

Natale J. Tummarello, 2073 Hillside Ave., Bellmore, N.Y. 11710

Continuation-in-part of Ser. No. 415,159, Nov. 12, 1973, abandoned. This application Apr. 23, 1976, Ser. No. 679,811
Int. Cl.² F16B 5/02, 39/00
U.S. Cl. 151—41.7 **4 Claims**



1. Means for fastening wall panels, structural concrete beams, girders, machinery and equivalent members to a supporting structure comprising,

an internally threaded hollow first member, said member being anchored to a member which is to be mounted on a supporting member with a self-locking bolt,

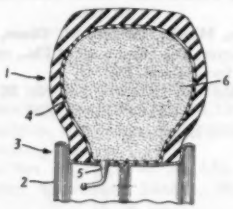
an externally threaded hollow member mounted in the threads of said first member, and being axially adjustable therein, said second member having opposed, substantially planar internal tapering surfaces defining a tapering hollow interior dovetailed keyway perpendicular to its axis, an internally threaded nut having opposed, substantially planar external tapering surfaces mounted in said tapering keyway, the degree of taper being the same on said nut and said keyway, the depth of the tapered extent of the hollow member beng greater than the; length of taper on the nut so that the nut will move near the bottom of hollow space and will be freely movable within the hollow member during adjustment therein, the width of the nut at the top of the taper being greater than the width of the taper at the top of the hollow member, so that the nut is held in the keyway when the bolt moves the nut in the axial direction, said tapering nut being movably mounted within said tapering hollow keyway throughout 360°, the nut being movable the length of the keyway, while the tapering hollow member with the keyway and the nut is threadedly moved in the anchored internally threaded hollow member to align the thread of the tapering nut with a hole of a structural supporting member through which the self-centering bolt passes and threadedly engages nut, the tapered walls of said hollow member having first substantially axially extending, straight thread-like striations thereon, said striations being relatively minute and being only on the upper three-quarters portion of said surfaces, second identical striations on the full tapering surfaces of said nut whereby said nut surfaces may interlock in the tapering striated surfaces of said hollow member as the bolt moves the nut up to locking tapering surfaces and interlocking striation, thus gaining the strength of the dovetailed keyway and stability through interlocking of the striations, and means for maintaining the nut in a desired position along the length of the keyway.

4,027,712

TIRE FILLED WITH LUBRICANT COATED CELLULAR PARTICLES

Henri Verdier, Beauregard-l'Eveque, France, assignor to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie, France

Division of Ser. No. 535,699, Dec. 23, 1974. This application June 6, 1975, Ser. No. 584,335
Claims priority, application France, Dec. 21, 1973, 73.46442
Int. Cl.² B60C 7/12, 17/00, 21/08, 29/00
U.S. Cl. 152—311 **10 Claims**



6. A tire mounted on a wheel rim so as to form a tire cavity having an inflation valve and a separate particle introducing orifice provided with a plug, said tire cavity being filled at least partially with solid lightweight discrete particles of cellular material having a very low apparent density of less than about 100g./dm³ but resistant to stresses due to travel, said particles bearing a lubricant which is inert with respect to the materials present in the tire cavity and being free to move relative to one another with low friction and low generation of heat when they have to cushion the tire after a puncture of the tire cavity and plug the puncture hole, said particles having been introduced into the tire cavity in an airstream by causing air pressure to act on a supply of said particles contained in an airtight enclosure connected by a tube to the particle introducing orifice of the tire cavity, the inflation valve of the tire cavity having been kept open during said operation.

4,027,713

LUBRICANT CONTAINER ASSEMBLY

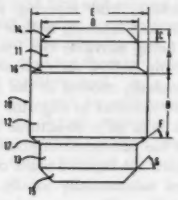
Michael John Kenney, Erdington, England, assignor to Dunlop Limited, London, England

Filed June 13, 1975, Ser. No. 586,609

Claims priority, application United Kingdom, June 21, 1974, 27545/74

Int. Cl.² B60C *17/00*

U.S. Cl. 152—330 L **14 Claims**



1. A device for a tire and wheel assembly for containing and releasing a lubricant, comprising:

a container having an orifice bounded by an edge;

a sealing member having a central resilient portion, at least partially of elastomeric material and which is in an interference fit in the orifice, the orifice being positioned to cause local deformation of the material of the central portion so that the sealing member is retained in the orifice by engagement of the edge of the orifice with the sealing member, the sealing member having at its end external to the container a projecting outer end portion of smaller cross-sectional dimensions than the orifice so that the central portion can be moved out of the orifice and into the container while part of the projecting portion remains outside the container, means on the end external to the container for holding away from the edge of the orifice the junction between the end and the central portion and the sealing member having at its end inside the container a further inner end portion of smaller cross-sectional dimensions than the orifice.

4,027,714

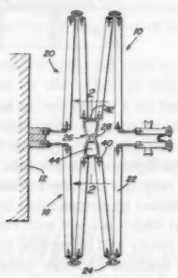
HINGE STRIP FOR DUAL WALL ACCORDION FOLDING DOOR

Guy E. Dixon, Miami; Thomas M. Dixon, Hollywood, and Russell I. Geyer, Jr., Miami, all of Fla., assignors to Panelfold Doors, Inc., Miami, Fla.

Filed May 18, 1973, Ser. No. 361,852

Int. Cl.² E06B *3/94*

U.S. Cl. 160—84 R **11 Claims**



1. An accordion folding door including dual walls, each defined by a plurality of panels having edges pivotally connected together, means pivotally connecting certain adjacent panels of one wall to corresponding adjacent panels in the other wall thereby defining an inner hinge means connecting four panels together, said hinge means comprising a vertically continuous strip of material including a central body and four radiating flanges, said flanges being connected with the edges of the four panels, said strip and flanges constructed of resilient flexible material to enable relative pivotal movement of the panels and acoustically isolate the panels from each other and the walls of the dual wall door from each other, said flanges being oriented in adjacent pairs, a flexible web interconnecting the flanges of each pair in spaced relation to the central body thereby defining a vertically continuous void space between the pair of flanges for maintaining acoustical integrity of the strip.

4,027,715

DOOR

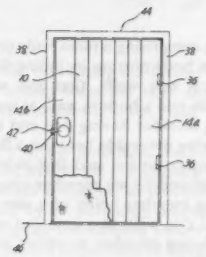
Tsuyoshi Tohma, Yamatotakada, Japan, assignor to Tohma Kohan Kabushiki Kaisha, Yamatotakada, Japan

Filed Nov. 21, 1975, Ser. No. 634,063

Claims priority, application Japan, Nov. 25, 1974, 49-136912; Aug. 30, 1975, 50-105334

Int. Cl.² E05D *3/48*

U.S. Cl. 160—181 **8 Claims**



1. A door assembly comprising:

a. a pair of spaced, parallel, vertical posts;

b. a horizontal lintel and a spaced, parallel horizontal floor defining portion both of which extend between said posts; said lintel, said floor defining portion of said posts defining a door opening;

c. a door in said opening, said door including a tough, flexible, substantially non-elastic sheet and a plurality of vertical unit blocks fixed to one surface of said sheet and arranged in side-by-side relationship with each other, each of the unit blocks having a thickness substantially greater than the thickness of the flexible sheet:

d. said door having a first vertical door side closely adjacent to and parallel with one of said vertical posts and a second vertical door side closely adjacent to and parallel with the other of said vertical posts;

e. each of said unit blocks having vertical side surfaces the entireties of which are of a flat planar configuration, the side surfaces of adjacent unit blocks fully contacting each other when said door is in said closed position;

f. said unit blocks being arranged in a series, all of said unit blocks extending substantially the entire vertical length of said posts in parallel relationship therewith, a first unit block of said series being disposed immediately adjacent said one vertical post, one of said vertical side surfaces of said first unit block facing said one post and defining said first vertical door side, said door being fixedly connected with said one vertical post by connecting means, said connecting means being coupled with said door in the region of said first vertical door side;

g. said door being unconnected with said lintel and floor defining portion and being free to swing away therefrom during opening;

h. whereby said door may flex sideways toward said sheet to an open position while permitting each of the unit blocks to move out of contact with the side surface of each

adjacent unit block, the door being retainable in its closed position by each of the unit blocks coming into intimate fitting contact with the side surface of each adjacent unit block to prevent the door from warping.

4,027,716
METHOD FOR PREPARING A CONTINUOUS CASTING BELT

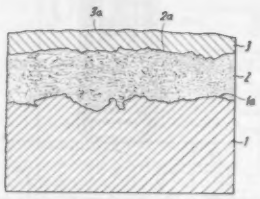
Reiner Theobald, Frankfurt am Main, and Ulrich Heubner, Bad Homburg, both of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany and Schweizerische Aluminium AG. Zurich, Switzerland, part interest to each

Filed Mar. 7, 1975, Ser. No. 556,311

Claims priority, application Germany, Mar. 11, 1974, 2411448; May 6, 1974, 2421801

Int. Cl.² B22C *3/00*; B22D *11/06*

U.S. Cl. 164—19 **8 Claims**



1. A method of making a pair of metal-casting belts for a continuous casting apparatus for use with a specific metal to be cast between them, comprising the steps of applying for each belt a heat-lagging layer on a belt substrate, and depositing at least one abrasion-resistant cover coating on said heat-lagging layer to form the casting-engaging surface of the belt, said cover coating consisting of at least one metal having a melting point in ° K at least equal to 0.7 times the melting point in ° K of the metal of the casting.

4,027,717
METHOD FOR FORMING A CASTING MOLD AND A FLEXIBLE PATTERN TO BE USED THEREFOR

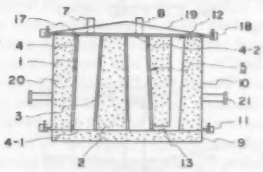
Mitushi Mio, 4 - 2 Kamikamo, Sumoto, Hyogo, Japan

Filed Sept. 17, 1975, Ser. No. 614,155

Claims priority, application Japan, Oct. 7, 1974, 49-115761

Int. Cl.² B22C *9/00*; B28B *7/32*

U.S. Cl. 164—44 **13 Claims**



1. A method for forming a casting mold to be used for the manufacture of hollow metal castings, said method comprising:

forming a tubular, hollow outer flexible pattern member by providing plural plate members arranged generally in the configuration of a predesigned casting outer surface, and wrapping a flexible cloth member around exterior surfaces of said plate members and adhering said cloth member to said exterior surfaces of said plate members, thereby forming a tubular outer flexible pattern member having open opposite ends;

forming a tubular, hollow inner core mold from at least one rigid plate arranged generally in the configuration of a predesigned casting inner surface, thereby forming a tubular core mold having open opposite ends;

placing first ends of said flexible pattern member and said core mold on a mold bottom member, with said core mold within said flexible pattern member, and air-tightly sealing said first ends;

air-tightly sealing second ends of said flexible pattern member and said core mold, to form an enclosed space between said flexible pattern member and said core mold;

supplying fuid into said enclosed space to expand and form said flexible pattern member into precisely the configuration of said predesigned casting outer surface;

placing an outer mold around said flexible pattern member;

supplying mold forming material into a space between said outer mold and said flexible pattern member and into a space within said core mold, and allowing said mold forming material to substantially harden to form a casting mold;

removing said fluid from said enclosed space and allowing said flexible pattern member to contract inwardly from the casting mold; and

removing said flexible pattern member and said core mold from the casting mold without separation of said mold bottom member from said casting mold.

8. A pattern for forming a casting mold to be used for the manufacture of hollow metal castings, said pattern comprising:

a tubular, hollow outer flexible pattern member formed of a plurality of plate members arranged generally in the configuration of a predesigned casting outer surface, and a flexible cloth member wrapped around and adhered to exterior surfaces of said plate members;

a tubular, hollow inner core mold formed of at least one rigid plate arranged generally in the configuration of a predesigned casting inner surface;

said inner core mold being positioned within said flexible pattern member;

means closing opposite adjacent ends of said flexible pattern member and said inner core mold and forming an enclosed space therebetween; and

means for supplying a fluid into said enclosed space to expand and form said flexible pattern member into precisely the configuration of said predesigned casting outer surface, said flexible pattern member being capable of inward expansion upon release of said fluid from said enclosed space.

4,027,718
PROCESS FOR MANUFACTURING A REINFORCING MATERIAL FOR CONCRETE

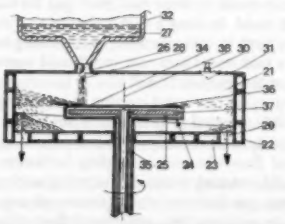
Bengt G. S. Lundgren, Ulricehamn, Sweden, assignor to SKF Nova AB, Goteborg, Sweden

Filed Nov. 24, 1975, Ser. No. 634,341

Claims priority, application Sweden, Nov. 26, 1974, 7414809

Int. Cl.² B22D *23/08*

U.S. Cl. 164—46 **3 Claims**



1. A process for manufacturing a reinforcing material for

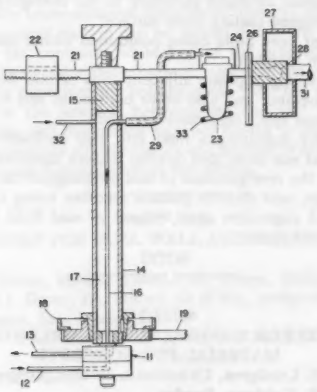
concrete, said material being a multitude of short and substantially straight steel reinforcing elements of substantially rectangular cross section and small thickness in relation to their length and width, intended to be uniformly distributed and in principle randomly orientated in the concrete, characterized by causing molten steel, which is of such a composition that rapid cooling of thin layers of the melt produces relatively flexible, difficult to crush films, to impinge upon at least one relatively cold metal surface of great cooling capacity, moving rapidly substantially across the direction of delivery of the molten steel, to form at least one discrete, relatively thin flake-shaped layer of molten steel on the metal surface, and causing the relatively thin layer to solidify on the metal surface with great cooling capacity, to form a relatively thin, flexible and difficult to crush steel flake with a relatively rough surface and shape tapering towards the end of the flake, and mutually adjusting the parameters which determine the dimensions of the steel flakes so as to give the flakes a thickness of at least about 0.1 mm and at most about 0.5 mm and a length of at least about 100 times the thickness.

4,027,719

ARGON BATH INDUCTION CASTING SYSTEM

Willy Strempel, Hamburg, Germany, assignor to Ultratek International, Inc., Concord, Calif.

Filed Mar. 24, 1976, Ser. No. 670,094
Int. Cl.² B22D *13/00*
U.S. Cl. 164—51 **9 Claims**



1. A method of metal casting, comprising the steps of providing a crucible secured to a centrifuge arm, and a metal flow channel extending therefrom to a porous mold spaced radially outwardly therefrom, supplying an inert gas to said crucible, applying a continuous vacuum to the exterior distal portions of said porous mold to draw said inert gas through said channel and said mold, heating a metal charge to a molten state in the inert gas bath in said crucible, and rotating said centrifuge arm to drive said metal into said mold, said vacuum removing any gas from the molten metal.

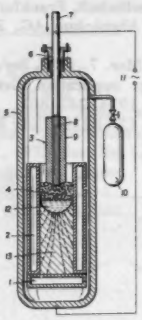
3. An apparatus for metal casting, comprising a centrifuge arm, a crucible secured to said arm, a porous mold secured to said arm and spaced radially outwardly from said crucible, a closed metal flow channel extending between said crucible and said mold, rotating means for rotating said centrifuge arm at high speed, gas delivery means for supplying an inert pressurized gas to said crucible, said metal flow channel, and said mold, and vacuum means for continuously applying a vacuum to the exterior distal portions of said mold.

4,027,720

METHOD OF PRODUCING HOMOGENOUS INGOTS OF HIGH-MELTING, NITROGEN-CONTAINING ALLOYS

Erwin Plöckinger; Otto Daghofer, both of Kapfenberg, Austria, and Farouk Barakat, Damaskus, Syria, assignors to Vereinigte Edelstahlwerke AG, Vienna, Austria

Filed Feb. 23, 1976, Ser. No. 660,233
Claims priority, application Austria, Feb. 25, 1975, 1404/75
Int. Cl.² B22D *7/00, 27/20*
U.S. Cl. 164—52 **19 Claims**



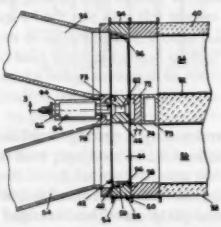
1. In a method of producing homogenous ingots of high-melting, nitrogen-containing alloys having nitrogen contents exceeding the solubility limit at atmospheric pressure by electric slag remelting under a pressure higher than atmospheric pressure, the improvement comprising employing a composite electrode having at least one core consisting essentially of a first nitrogen-containing alloy and a jacket consisting essentially of a second nitrogen-containing alloy, said first nitrogen-containing alloy having a nitrogen content differing from the nitrogen content of said second nitrogen-containing alloy in that one of these nitrogen contents is hgher than the nitrogen content of the ingot to be produced, while the nitrogen content of the respective other nitrogen-containing alloy is lower than that of the ingot to be produced.

4,027,721

ROTARY HEAT EXCHANGER WITH IMPROVED SEAL STRUCTURE

Charles B. Gentry, Grand Rapids, Mich., assignor to AGM Industries, Inc., Grand Rapids, Mich.

Division of Ser. No. 400,314, Sept. 24, 1973, Pat. No. 3,942,953. This application May 9, 1975, Ser. No. 576,214
Int. Cl.² F28D *19/00*
U.S. Cl. 165—9 **6 Claims**



1. In a rotary heat exchanger for recuperating heat from hot gases wherein a ceramic heat exchanger wheel having a plurality of passages extending axially therethrough is mounted for rotation about a central axis and a seal member surrounds said heat exchanger wheel in sealed relationship thereto, the improvement which comprises:

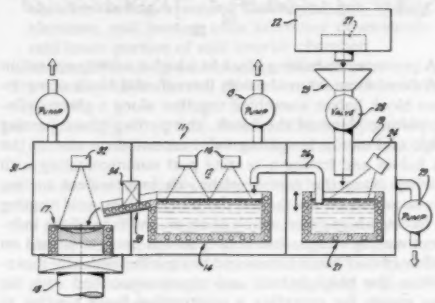
said heat exchanger wheel having an axially tapered circumferential surface which has said central axis of said heat exchanger as its center of rotation, and said seal member formed of a refractory material and including a tapered circumferential surface of said heat exchanger wheel, whereby a gap seal is formed between said complementary surfaces on said heat exchanger wheel and said seal member.

4,027,722

ELECTRON BEAM FURNACE

Charles d'A. Hunt, Larkspur, Calif., assignor to Airco, Inc., Montvale, N.J.

Continuation-in-part of Ser. No. 255,625, Feb. 1, 1963, abandoned. This application July 27, 1965, Ser. No. 477,357
Int. Cl.² B22D *11/10*
U.S. Cl. 164—64 **15 Claims**



1. A high vacuum furnace for treating metals and alloys comprising, an air tight enclosure including a receiving zone, a processing zone, and a casting zone, an air tight barrier wall separating each of said zones, a hearth within said processing zone for receiving molten material to be treated, electron beam beating means for heating the molten material in said processing zone, pump means for exhausting said processing zone to a low absolute pressure, means for introducing molten material into said receiving zone, a receptacle within said receiving zone for receiving the molten material, means for heating the material in said receptacle, pump means for exhausting said receiving zone to a low absolute pressure, a feed tube extending in sealed relation through said barrier between said receiving zone and said processing zone, one end of said feed tube being positioned so as to be disposed within said receptacle below the normal level of molten material therein and the other end terminating adjacent said hearth, means for effecting relative movement between said feed tube and said receptacle so as to remove said one end of said feed tube from below the level of molten material in said receptacle, means for selectively sealing said feed tube, means defining a sealed flow path between said processing zone and said casting zone through said barrier therebetween, and means in said casting zone for receiving the molten material for withdrawal from the furnace.

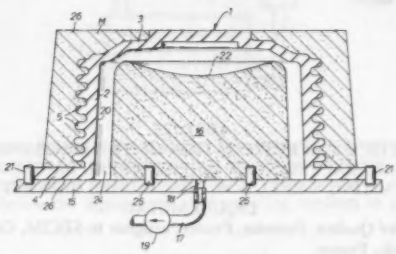
4,027,723

MOLDING APPARATUS INCLUDING A FLEXIBLE MOLD FOR MAKING ARTICLES HAVING RADIALLY INWARDLY EXTENDING PROJECTIONS ON AN INTERIOR SURFACE

William J. Maurino, and Raymond M. Putzer, both of Racine, Wis., assignors to Precision Flexmold, Inc., Racine, Wis.

Filed Jan. 20, 1975, Ser. No. 542,215
Int. Cl.² B22C *17/00*, *7/00*
U.S. Cl. 164—213 **3 Claims**

1. Apparatus for molding a generally hollow and seamless article having undercut portions comprising a one-piece distensible and flexible hollow male mold having a generally cylindrical side wall having a plurality of radially outwardly extending annular projections for defining radially inwardly extending grooves and ridges on the inside surface of an article molded thereon, said flexible mold also having an end wall extending across one end of said side wall such that said mold defines a generally cylindrical cavity, said male mold also having an annular radial flange extending outwardly from said side wall and at an end thereof which is opposite from said end wall, a mandrel receivable in said generally cylindrical cavity and defining a generally annular vacuum chamber with said mold, plate means extending across and abutting against said



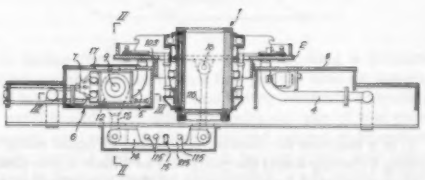
flange and said mandrel for removably supporting said mold and mandrel and having a sealing engagement therebetween, aligning means between said plate means and said mold flange and said mandrel for accurately but removably locating said mold and mandrel on said plate means, said mandrel being foraminous such that a vacuum may be drawn evenly through said mandrel for insuring radially inward collapse of the flexible mold, said plate means having a fluid pressure connection to a source of vacuum such that a vacuum may be drawn through said plate means and said mandrel and from said annular vacuum chamber to cause said mold to contract radially inwardly to release a molded article from around said mold.

4,027,724

ROCKING DEVICE FOR CONTINUOUS CASTING MOLDS

Piero Colombo, 27, Via Leopardi, Udine, Italy

Filed Apr. 23, 1976, Ser. No. 679,566
Claims priority, application Italy, Apr. 30, 1975, 12590/75
Int. Cl.² B22D *11/06*
U.S. Cl. 164—260 **7 Claims**



1. A continuous casting plant for metals comprising:
a fixed frame,
a first table fastened to said fixed frame and a motor secured to said first table,
a vertical guide means secured to said first table for supporting and guiding a second table for vertical reciprocating movement,
a mold supported by the second table for vertical reciprocating movement along with the second table, at least a portion of the mold being located at the same level as the said motor,
a first connecting rod operatively connected to the output

shaft of the motor and extending downwardly therefrom to reciprocate vertically,

a second connecting rod articulated at one end to the second table and extending downwardly therefrom,

and a lever extending horizontally at a level below the level of the motor and of the mold, said lever fulcrumed at an intermediate position to a frame secured to the first table, and the opposite ends of said lever connected respectively to the lower ends of the first and second connecting rods,

whereby the motor, acting downwardly through the first connecting rods and across the lever and upwardly along the second connecting rods effects vertical reciprocating movement of the second table and hence also of the mold.

4,027,725

DEVICE FOR RESTORATION OF THE MECHANICAL CHARACTERISTICS OF THE METAL BAND IN A CASTING WHEEL FOR CONTINUOUS CASTING OF LIQUID METAL

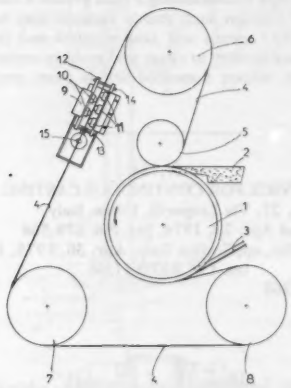
André Quehen, Pontoise, France, assignor to SECIM, Courbevoie, France

Filed Nov. 9, 1976, Ser. No. 739,866

Claims priority, application France, Dec. 3, 1975, 75.37044

Int. Cl.² B22D *11/06*

U.S. Cl. 164—278 **2 Claims**



1. In a machine for continuous casting of liquid metal comprising a casting-wheel the periphery of which is provided with a groove covered over a portion of the circumference of the wheel by an endless metal band which defines with the groove a rotary mould for the liquid metal, the improvement comprising a device for the restoration of the mechanical properties of the metal band used for closing the mould of the machine, the device comprising planishing rollers arranged with their axes parallel with the axis of the casting wheel and located on opposite sides of the band in a zone where the band is not in contact with the casting wheel, a frame, means for mounting said rollers for rotation in said frame and so as to bear against the two faces of the band and so that said rollers are not opposite one another on each side of the band, and means for connecting said frame to the frame of said machine.

4,027,726

PRESSURE DIE-CASTING BLOCK WITH A VENTING VALVE

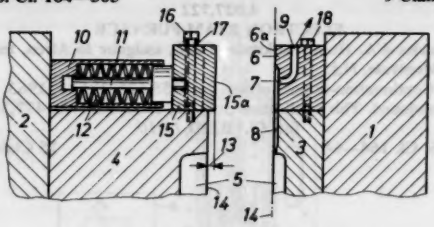
Fritz Hodler, 3 Chemin du Chatagny CH 1842, Territet, Switzerland

Filed June 4, 1975, Ser. No. 583,665

Claims priority, application Germany, June 10, 1974, 2427970

Int. Cl.² B22D *17/20*

U.S. Cl. 164—305 **9 Claims**



1. A pressure die-casting block in which a casting operation is performed in an internal cavity thereof, said block comprising two block halves assembled together along a plane defining a parting plane of the block, the parting plane passing through said cavity, a venting valve mounted on one of the block halves and having a venting port communicating with the cavity along the parting plane, an independent mating means mounted on another of the block halves, said venting valve having an end face which abuts an end face of the independent mating means, said mating means being mounted on the other of said block halves and being independently moveable from the block halves, and means associated with the mating means for providing a prestressing force tending to hold said abutting faces together in the assembled condition of the half blocks, which force is independent of and additional to that force holding the block halves together in said assembled condition.

4,027,727

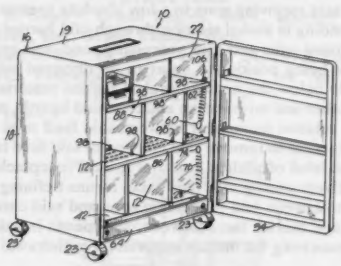
PORTABLE BATTERY OPERATED HOT-COLD STORAGE UNIT

Gedell Pullens, P.O. Box No. 198, New York, N.Y. 10025

Filed Feb. 12, 1975, Ser. No. 549,318

Int. Cl.² F25B *29/00*, *27/00*; A47B *77/08*

U.S. Cl. 165—48 **4 Claims**



1. A portable battery operated cold-hot food storage unit having an interior chamber capable of holding food articles contained therein in a fixed vertical position, which comprises:

a. an outer rectangularly shaped housing having a base, a pair of upwardly extending sidewalls, an upwardly extending rearwall, and an open front face;

b. an inner rectangularly shaped metallic shell contained within said housing, said shell having a base, a pair of upwardly extending sidewalls, an upwardly extending rearwall, and an open front face;

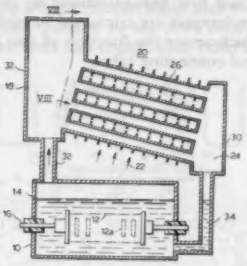
c. an insulation layer sandwiched between said outer housing and said inner shell;
d. a door hingably mounted onto said housing, said door having an outer layer, an inner layer, and an insulation layer sandwiched between said inner layer;
e. a horizontal partition affixed onto said walls of said inner shell dividing said interior chamber into an upper and a lower portion;
f. a cooling assembly consisting of a fluid tank, a compressor, an electric motor, an expansion valve, and a condensor contained in said lower portion of said interior chamber;
g. a removable plate covering said open front face of said lower portion of said interior chamber;
h. means for powering said electric motor;
i. a first section of said upper portion of said interior chamber having a first thermostat and cooling coil elements therein and communicating with said cooling assembly;
j. a second section of said upper portion of said interior chamber having a second thermostat and heating coil elements, said heating coils extending downwardly into said lower portion of said interior chamber;
k. means for heating said heating coil elements;
l. a plurality of horizontal shelves contained in said upper portion;
m. a plurality of vertical shelves contained in said upper chamber, said vertical shelves aligned side to side or front to back;
n. means for adjustably affixing said horizontal shelves to said sidewalls of said inner casing, said means comprising a plurality of mounting brackets, each said bracket consisting of an elongated U-shaped flange having a magnetic circular disc affixed onto one end of said U-shaped flange each said magnetic circular disc engaging said sidewalls of said inner shell;
o. a pair of retractable metallic pin members mounted each end of each said horizontal and vertical shelve, said pin members extending linearly outwardly from each said shelve, said pin members of each said horizontal shelve resting into one said U-shaped flange;
p. means for adjustably affixing said vertical shelves between said horizontal shelves, said means comprising each said horizontal shelve having a plurality of longitudinal aligned rows of apertures therethrough, said pin members on each end of each said vertical shelve inserting into said apertures of two said horizontal shelves; and
q. means for adjustably affixing said vertical shelves between one said horizontal shelf and said upper end of said inner shell or one said horizontal shelf and said bottom base of said inner shell, said means comprising a plurality of mounting members, each said mounting member consisting of an elongated cylindrically shaped sleeve having a magnetic base member affixed onto one end of each said sleeve, said magnetic base member engaging with said upper end of said inner shell and said pin members inserting into each said sleeve of each said mounting member, as well as said aperture of said horizontal shelf.

4,027,728
VAPOR COOLING DEVICE FOR SEMICONDUCTOR DEVICE

Gai Kobayashi; Yoshiro Shikano, and Masao Yano, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 31, 1975, Ser. No. 563,354
Int. Cl.² H01L *23/42*
U.S. Cl. 165—105 **2 Claims**

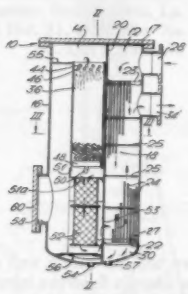
1. A cooling device for cooling a heat generating semiconductor device comprising a vessel, an amount of a cooling medium disposed in said vessel, said cooling medium having a liquid phase and a vapor phase and effecting a phase transition therebetween to cool a heat generating member, condenser means operatively connected to said vessel to condense said cooling medium from its vapor phase into its liquid phase and including a pair of spaced opposed headers having a substantial vertical dimension in the vertical cross-section thereof, a plurality of cooling tubes connected in parallel between said headers, one of said headers being an inlet header and being connected to said vessel to receive vapor therefrom and having a space therein at a level higher than the openings into said cooling tubes for collection of any gas entrained in said device, and conduit means connecting the other header to said vessel below the liquid level of the cooling medium in said vessel.



4,027,729
DEVICE FOR CHILL-DRYING A GAS

Peter Brühl, Fehmarnstr. 1, 4 Dusseldorf-Nord, Germany

Filed July 15, 1974, Ser. No. 488,798
Claims priority, application Germany, July 13, 1973, 7325183[U]
Int. Cl.² F28B *1/00*
U.S. Cl. 165—111 **5 Claims**



1. A device for chill-drying a gas comprising a pressure vessel having an inner surface, a first gas/gas heat exchanger, located in said pressure vessel and having vertically extending tubes parallel with each other and with the axis of said pressure vessel, said tubes defining first and second independent generally vertical fluid paths each having upper and lower ends and in heat-exchanging relationship, a gas outlet at said lower end of said first path and a gas inlet at said lower end of said second path, a second gas/cooling medium heat-exchanger located in said pressure vessel and extending vertically alongside said first heat-exchanger and having two independent fluid paths in heat-exchanging relationship, each of said fluid paths of said second heat-exchanger being generally vertical and having upper and lower ends, a gas inlet at said upper end and a gas outlet at said lower end of one of said fluid paths of said second heat-exchanger, and channels defined between said first and second heat-exchangers and said inner surface of said pressure vessel for connecting said gas outlet of said first heat-exchanger with the said gas inlet of said

second heat-exchanger, and means for connecting said gas outlet of said second heat-exchanger with said gas inlet of said first heat-exchanger whereby in use of the device the gas to be treated flows through said first path of said first heat-exchanger, through said channels, through one of said paths of said second heat-exchanger and finally through said second fluid path of said first heat-exchanger so that the first and second heat-exchangers are contained in said common pressure vessel which serves the function of two individual pressure vessels and connecting tubes.

4,027,730

SEAL ASSEMBLY FOR FLUID INJECTION PUMP-DOWN TOOLS

Derry D. Sparlin, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed June 28, 1976, Ser. No. 700,696
Int. Cl.² E21B *33/16*
U.S. Cl. 166—156 **5 Claims**

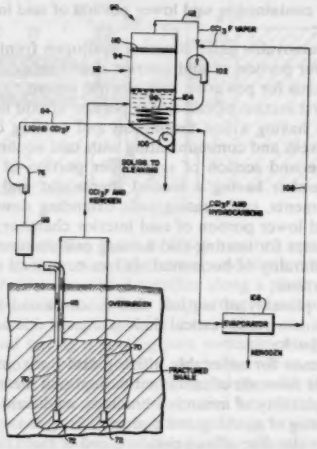
1. In a pump-down tool for use in well maintenance and treatment operations wherein fluids are injected into or circulated in a well, said tool including a tubular member, having locomotive means positioned thereabout and a fluid passageway positioned therethrough, and a fluid injection means positioned in fluid communication with the lower end of said tubular member as positioned for use; said well having positioned therein a first tubing member and a second tubing member, said first and second tubing members being in fluid communication at a junction near their lower ends, so that when placed in said first tubing member said tool is urged along the length of said first tubing member toward said junction by pumping fluid sequentially through said first tubing member, said junction and said second tubing member and is urged along the length of said first tubing member toward the upper end of said first tubing member by pumping fluid in the opposite direction, the improvement comprising: a sealing ring means positioned around said tubular member, and positioning means on said tubular member for releasably maintaining said sealing ring in position at an angle of at least about 5° from a position perpendicular to the axis of said tubular member.

4,027,731

METHODS OF AND APPARATUS FOR HYDROCARBON RECOVERY

Clay D. Smith, and D. V. Keller, Jr., both of Lafayette, N.Y., assignors to Otisca Industries, Ltd., Lafayette, N.Y.

Division of Ser. No. 460,558, April 12, 1974, Pat. No. 3,941,679. This application Aug. 26, 1975, Ser. No. 607,808
Int. Cl.² E21C *41/10;* **E21B** *43/28*
U.S. Cl. 166—267 **9 Claims**



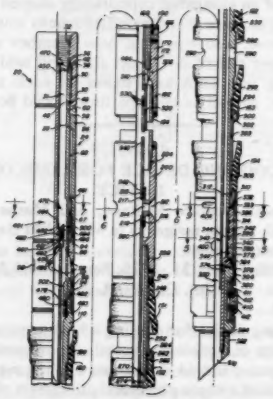
1. A method of mining hydrocarbon bearing geological composites which includes the step of directing a solvent which is essentially non-reactive with said hydrocarbons under the process conditions and is or comprises trichlorofluoromethane against a deposit or formation of said composite to extract hydrocarbons therefrom and form a fluid phase containing the hydrocarbons.

4,027,732

TOOL FOR WASHING PERFORATIONS IN CASED WELL BORE

Lee E. Perkins, 127 Malibou Blvd., Houma, La. 70360, assignor to Kajan Specialty Company, Inc., Houma, La.

Filed Aug. 6, 1975, Ser. No. 602,414
Int. Cl.² E21B *37/00*
U.S. Cl. 166—312 **29 Claims**



1. A tool for washing perforations in the casing of a cased well bore, the tool comprising:

an elongated cylindrical housing having a top adapted to connect to the lower end of a tubular member suspended in the casing;

first sealing means near the top of said housing, and adapted to be positioned above the uppermost perforation in said casing, for blocking the downward passage of fluid between said housing and said casing, but for enabling the passage of fluid in an upward direction,

second sealing means below and spaced from said first sealing means for blocking the upward passage of fluid between said housing and said casing;

third sealing means below and closely spaced from said second sealing means for blocking the downward passage of fluid between said housing and said casing;

first fluid passage means through said housing between said second and third sealing means;

second fluid passage means through said housing above said first sealing means;

first valve means for selectively opening or closing said second fluid passage means;

third fluid passage means through said housing below said third sealing means;

second valve means for selectively opening or closing said third fluid passage means;

fourth fluid passage means through said housing intermediate said first and second sealing means;

fluid opening means at the bottom of said housing for enabling fluid to communicate between the interior of said housing and said well bore; and

control means for operating said first and second valve means to open said second fluid passage means while said third fluid passage means is closed, to open said second fluid passage means while said third fluid passage means is opened, and to close said second fluid passage means while said third fluid passage means is closed.

17. A method for injecting into or washing perforations in the casing of a cased well bore with a well tool having a first sealing means near the upper region thereof for preventing downward passage of fluid in the casing annulus between the exterior of the tool and the casing, second sealing means below and spaced from the first sealing means for preventing the upper passage of fluid in the casing annulus, and third sealing means near but below the second sealing means for preventing the downward passage of fluid in the casing annulus, the method comprising the steps of:

lowering the well tool into the cased well bore with the second and third sealing means on opposite sides of a perforation,

delivering a pressurized stream of fluid down the casing annulus above the first sealing means, directing the fluid into an interior passage of the well tool, and then out an opening in the interior wall of the well tool between the second and third sealing means and out the perforation between the second and third sealing means;

return circulating the fluid to the surface of the well through a central bore of the well tool; and

should a perforation require a high pressure for injection or washing, adjusting the well tool and delivering a pressurized stream of fluid down the interior passage, out the opening between the second and third sealing means, through the high-pressure perforation and toward the surface of the well through the central bore and casing annulus.

4,027,733

WEED PULLING MACHINE

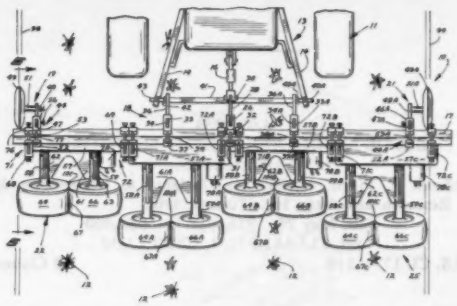
Fred W. Eisenhardt, 610 University Drive N., Fargo, N. Dak. 58102, and Wayne S. Tonsfeldt, Sabin, Minn. 56580

Filed Aug. 28, 1975, Ser. No. 608,681

Int. Cl.² A01D *25/04, 49/00*

U.S. Cl. 171—58 **24 Claims**

1. An apparatus for pulling weeds and the like from a row of crops and weeds comprising: a transverse tool bar mountable on a draft vehicle, a weed pulling unit attached to the tool bar, said unit having a housing and generally rearwardly directed spaced members attached to the housing, first shaft means rotatably mounted on one of the members, second shaft means rotatably mounted on the other of the members, first wheel means attached to the first shaft means, second wheel means attached to the second shaft means, said first and second wheel means being rotatable about axes located in planes extended generally parallel to the row, each of said wheel means having surfaces that engage each other and adapted to



engage the weeds in the row and pull the weeds out of the ground, power transmission means to drive said first and second wheel means in opposite directions whereby said weeds between said first and second wheel means are pulled from the ground, said power transmission means being located in said housing and drivably connected to the first shaft means and second shaft means to rotate the first and second shaft means in opposite directions, and power means operable to supply power to the power transmission means.

4,027,734

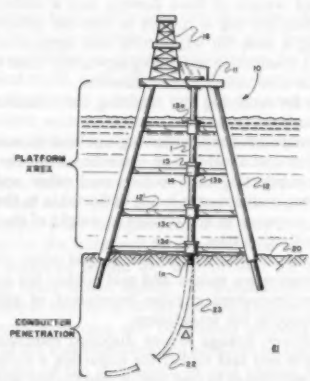
DEVIATED CONDUCTOR DRIVING SYSTEM

Lajos (Louis) Horvath, Norwich, England, assignor to Hebert & Co., Inc. Gurtler, New Orleans, La.

Filed Dec. 11, 1975, Ser. No. 639,857

Int. Cl.² E21B *7/08*

U.S. Cl. 175—9 **10 Claims**



1. A method of providing a deviated conductor system at an offshore body of water site for directional drilling of wells comprising the following steps:

a. providing an open ended conductor casing of incremental segments;

b. securing an open ended dog-leg section on the distal end of the otherwise straight conductor producing a longitudinally elongated, off-set portion extending over laterally past one side of the outer circumference of the otherwise straight conductor, said off-set being open ended;

c. setting said conductor through vertically aligned guides until the mudline is reached, maintaining or positioning the dog-leg in the desired directional orientation; and

d. driving said open ended conductor with said open ended dog-leg section through the substratum causing the conductor to be laterally deviated due to the interaction of the substratum against the offset, lower side surfaces of said dog-leg section from its entry into the substratum to its final deviated position.

4,027,735

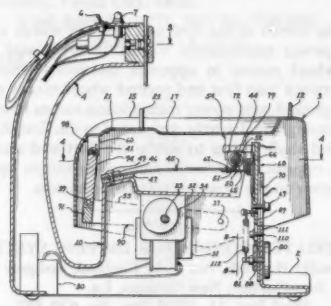
BLOOD MIXING AND WEIGHT MONITORING APPARATUS

Johnnie E. Floyd, Austin, Tex., assignor to Engineering & Research Associates, Inc., Tucson, Ariz.

Filed May 20, 1976, Ser. No. 688,400

Int. Cl.² A61B *5/14;* **G01G** *13/30*

U.S. Cl. 177—118 **13 Claims**



1. A dynamic weight monitoring apparatus for collecting a predetermined weight of fluid flowing into a collection bag while the collection bag is rocked to mix the collected fluid and including a base for supporting said apparatus upon a surface and a foundation extending upwardly from the base, said apparatus comprising in combination:

a. a rocker for receiving and retaining the collection bag in fixed relationship thereto;

b. weight responsive means having one end secured to the foundation and another end extending from the foundation for supporting said rocker, said other end of said weight responsive means being deflectable in the vertical plane in response to any change in weight of the contents of the collection bag;

c. pivot means disposed intermediate said other end of said weight responsive means and said rocker for accommodating reciprocating angular movement of said rocker with respect to the foundation;

d. motor driven linkage means disposed intermediate the foundation and said rocker for imparting a reciprocating vertical movement to one end of said rocker and producing a rocking motion of said rocker about said pivot means;

e. position sensing means extending from the foundation for detecting a predetermined downward deflection of said other end of said weight responsive means, which deflection is commensurate with the weight of a predetermined quantity of fluid that has flowed into the collection bag; and

f. indication means responsive to said sensing means for indicating that the predetermined quantity of blood has flowed into the collection bag.

4,027,736

LOAD-WEIGHING DEVICE

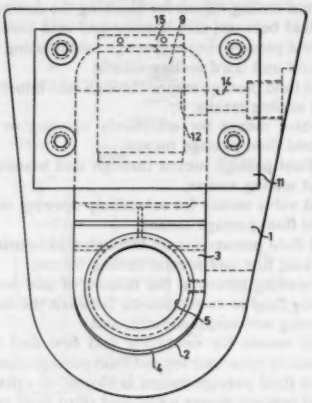
Karl Gunnar Bohlin, Sundsvall; Karl Rune Eriksson, Kvissleby, and Carl-Erik Gustafsson, Sundsvall, all of Sweden, assignors to SCA Development Aktiebolag, Sundsvall, Sweden

Filed Feb. 25, 1976, Ser. No. 661,194

Claims priority, application Sweden, Mar. 14, 1975, 7502903

Int. Cl.² G01G *19/18*

U.S. Cl. 177—147 **4 Claims**



1. A load-weighing device for indicating the weight of a load and for attachment to the load-carrying member of a lifting device, comprising:

a frame connected to said load-carrying member, the lower part of said frame including a curved surface,

a bearing block mounted in said frame for rotation relative to said load-carrying member, the upper surface of said bearing block having a curved shape, and the lower surface of said bearing block being curved, said bearing block being mounted in said frame to provide a clearance space between the curved surface of said frame and the lower curved surface of said bearing block, which clearance space is eliminated upon the application of a load,

a bearing member mounted in said frame and abutting said upper curved surface, and

a pressure-sensitive member mounted in said bearing member so that the force of a load is transferred by the lifting device to the pressure-sensitive member which operates to provide an accurate load-measuring value regardless of the distribution of the load or the non-planar positioning of the lifting device.

4,027,737

JACKING MEANS FOR PROVIDING ADDITIONAL CLEARANCE BETWEEN THE ENGINE AND BODY OF A REAR ENGINE DRIVEN VEHICLE

Frederick W. Garry, El Cajon, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

Filed May 9, 1975, Ser. No. 576,010

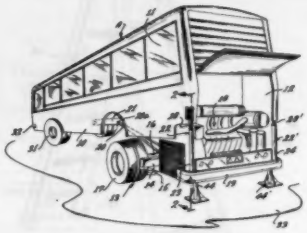
Int. Cl.² B60K *5/10*

U.S. Cl. 180—11 **3 Claims**

3. In a bus comprising a body with a forward passenger compartment and a rear engine compartment therein, with dirigible front support wheels journaled beneath a forward portion of the body, and a power drive unit removably docked in the rear end of the bus, said power drive unit comprising a frame releasably secured to a rear portion of the body, said frame having an extension extending a substantial distance forward from said engine and means pivotally connecting its forward end to the vehicle body and having the bus propulsion

engine mounted on said frame for location within the engine compartment, said engine being in operative, driving connection with a pair of rear support wheels journaled on an axle which is in resilient supporting relation with said frame, the improvement which comprises:

hydraulic jacking means interposed between an element of the power drive unit and a rear element of the bus body, and operable, upon release of the power drive unit frame



from the body, to elevate the rear end of the body relative to the power drive unit frame, thereby tilting the body about the axes of the front wheels as a fulcrum to provide additional working clearance between the propulsion engine and elements of the body adjacent thereto; and

means interposed between an element of the power drive unit and the ground to preclude movement of the power drive unit when the body is tilted.

4,027,738

DEVICE FOR CO-ORDINATED DRIVING OF A TOWING VEHICLE AND A TOWED VEHICLE

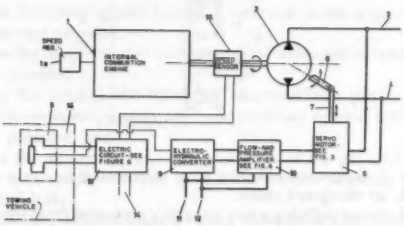
Lars Olof Lundin, Karlskoga, Sweden, assignor to AB Bofors, Bofors, Sweden

Filed Dec. 8, 1975, Ser. No. 638,257

Claims priority, application Sweden, Dec. 18, 1974, 7415880

Int. Cl.² B62D 59/04

U.S. Cl. 180—14 A **32 Claims**



1. Apparatus for controlling the torque applied to each driven wheel of a towed vehicle of a towing and towed vehicle combination, comprising:

a variable displacement hydraulic pump;

hydraulic motor means associated with each driven wheel, said hydraulic motor means being driven by the output of said variable displacement hydraulic pump; and further being selectively engageable with said driven wheel; and

means selectively operable from said towing vehicle for controlling the displacement of said variable displacement hydraulic pump to maintain thereby a preselected driving tor e delivered by said hydraulic motor means to said driven wheel, independent of the speed of said driven wheel.

4,027,739

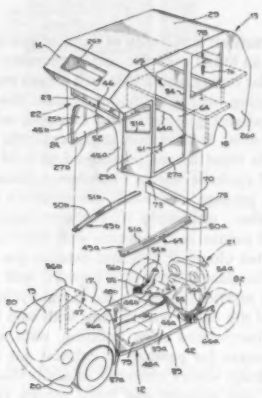
MINICAMPER

Douglas L. Allenthorp, 16222 Monterey Lane, No. 96, Huntington Beach, Calif. 92649, and Michael L. Gallcher, 11645 Mapledale St., Norwalk, Calif. 90650

Filed May 7, 1975, Ser. No. 575,352

Int. Cl.² B62D 23/00

U.S. Cl. 180—89.1 **9 Claims**



1. A camper body in combination with a chassis having front and rear wheels and a hood and front fenders supported thereon by a cowling support provided with shoulders on the side faces thereof, and including a floorboard having bracket arms extending rearwardly and angularly upwardly from the rear sides thereof,

said camper body comprising top, front, rear and sidewalls, with the lower portion of the front wall forming a frame disposed below an opening provided on the front wall for a windshield, said sidewalls having inwardly extending side floorboard portions on the bottoms thereof and provided with an upwardly stepped portion on the rear bottom thereof spaced inwardly of the rear wall thereof, and a transverse support member beneath said stepped portion, said transverse support member being shorter than and centered in the spacing between the sidewalls,

said camper body being mounted on said chassis with said frame on the front wall fitted about said cowling support and anchored to the top thereof with the sides of said frame being seated against the shoulders formed on the respective side faces of the cowling support and with the inwardly extending side floorboard portions on the bottom of the sidewalls disposed adjacent to and anchored to the sides of the floorboard of said chassis to provide a continuation thereof, and with the transverse support member beneath the stepped portion thereof resting on and anchored to said bracket arms,

whereby the inwardly extending floorboard portions on the bottoms of the sidewalls of the camper body provide for the floorboard of the assembled camper body being on the order of half again wider than the width of the floorboard of the chassis, and

whereby the stepped portion on the rear bottom of the camper body provides clearance within the sidewalls for the rear wheels on the chassis.

4,027,740

MULTI-CHAMBER MUFFLER

James F. Martin, P.O. Box 302, Hondo, Tex. 78861

Continuation of Ser. No. 548,190, Feb. 10, 1975, abandoned.
This application June 15, 1976, Ser. No. 696,421
Int. Cl.² F01N 1/08
U.S. Cl. 181—68 9 Claims

1. In a muffler: a plurality of exhaust gas transfer chambers including, an initial cyclonic vortex chamber having a forward wall, muffler casing, and baffle wall means mounted within the muffler casing, with a pronounced slant toward said forward wall; an exhaust gas expansion chamber within the muffler case, flow-wise, behind said initial cyclonic vortex chamber; exhaust gas input means positioned to feed exhaust gases to said initial cyclonic vortex chamber; exhaust gas flow outlet means for passage of exhaust gas products from said expansion chamber, ultimately to the atmosphere; wherein said baffle wall means is a common wall between said initial cyclonic vortex chamber and said exhaust gas expansion chamber with the slant toward said forward wall forming an acute angle with muffler casing on the initial cyclonic vortex chamber side of the baffle wall means; with said baffle wall means having a hurdle end edge defining, with said muffler case, opening means for passage of exhaust gas in flow from said initial cyclonic vortex chamber to said exhaust gas expansion chamber; said exhaust gas input means comprising a pipe extended through the forward wall of the muffler and into the confines of said vortex chamber to an outlet end termination near the center of said vortex chamber, said outlet end having an opening with dimension substantially smaller than one-half the vertical dimension of said vortex chamber and radially displaced from the chamber longitudinal axis toward the hurdle end edge of said baffle wall, said outlet end being positioned and directed to aid cyclonic vortex gas flow within said initial cyclonic vortex chamber; and, wherein the outlet end of said exhaust gas input means pipe is located at a relatively lower pressure area within the confines of and near the center of the gas flow cyclonic vortex established within said vortex chamber when exhaust gas is being fed from said exhaust gas input means pipe and through the muffler.

4,027,741

LOCKING HINGE MECHANISM FOR A STEPLADDER

Danny O. Derrick, Columbia, S.C., assignor to Shakespeare Company, Columbia, S.C.

Filed July 15, 1976, Ser. No. 705,478
Int. Cl.² E06C 1/12
U.S. Cl. 182—22 12 Claims

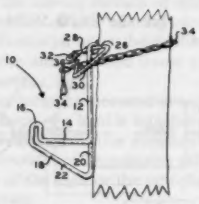
1. Hinge mechanism for a stepladder having front and rear sections hinged together at one end, comprising first pin and slot means on the upper end of one section engaging complementary slot and pin means on the upper end of the other section for hinging movement of said sections, said first and said complementary pin and slot means interlocking with each other to hold the sections in spread-apart relation and being disengageable by relative longitudinal movement of said sections to slide the pins out of the slots when the sections are folded together.

4,027,742

CLEAT FOR CLIMBING TREES AND THE LIKE

Aniel Hermas House, Jr., 2204 S. Tyler, Little Rock, Ark. 72204

Filed Aug. 2, 1976, Ser. No. 710,641
Int. Cl.² B60R 3/00
U.S. Cl. 182—92 3 Claims



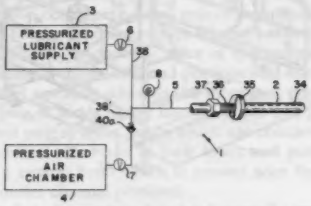
1. An improved climbing cleat comprising:
A. an elongated shank;
B. means defining a step angularly projected from the shank near one end thereof;
C. suspension means for removably suspending said shank from a vertically oriented body of a substantially cylindrical configuration including a cross bar extended transversely with respect to said shank and rigidly affixed to the end portion thereof opposite said one end having an arcuate midportion and a pair of end portions extended in substantial parallelism and inclined toward said step, a length of chain, and means located at each of the opposite ends of said cross bar for receiving said chain in a connected relationship therewith; and
D. stabilizing means for supporting said step against displacement including a support member extended angularly from the projected end of said step toward an extension of the longitudinal axis of said shank for imparting vertical support to the step.

4,027,743

AXLE END OIL FILL AND LEAKAGE DETECTOR METHOD OF CHARGING LUBRICANT

Robert J. Deller, and Edwin L. Carmel, both of Cincinnati, Ohio, assignors to Pullman Incorporated, Chicago, Ill.

Filed July 9, 1975, Ser. No. 594,385
Int. Cl.² F01M 1/20
U.S. Cl. 184—6.4 7 Claims



1. For a wheel hub including an outer end portion and a body portion,

said body portion incuding a pair of axially spaced bearings and a closed lubrication reservoir between said bearings and in lubricating relation therewith,

said outer end portion havng a selectably sealable lubricant filling port extending generally axially therethrough providing access between said lubricant reservoir and the exterior of the wheel hub, the improvement of

a lubrication apparatus for charging lubricant into said lubricant reservoir and detecting leaks therefrom, including:

separate sources of pressurized lubricant and pressurized gas,

a probe having an elongated shank insertably extendable through said lubricant filling port and into the lubricant reservoir and including sealing means cooperative with said outer end portion,

valve means for selectively closing and opening respective sources to said lubricant reservoir,

means for charging said lubricant reservoir under a predetermined pressure,

means for dropping said pressure of the lubricant to ambient pressure,

means for loading the lubricant reservoir with gas to a predetermined pressure after said lubricant reaches ambient pressure, and

means for monitoring any pressure drop of the gas within the lubrication reservoir to thereby detect potential or actual leaks.

7. A method of lubricating a closed lubrication system and detecting lubricant leakage while the system is under static conditions and which simulates dynamic conditions comprising:

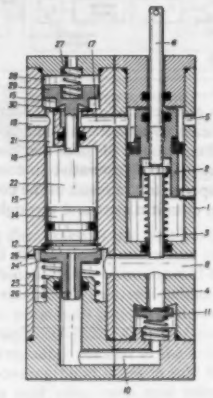
filling the system with lubricant under relatively high pressure displacing air in the system with the lubricant and compressing the air to a relatively small volume, then depressurizing the system and purging the air therein to return the system to ambient pressure then pressurizing the system with gas under relatively low predetermined pressure to slowly force the lubricant through the system, then closing the gas under said pressure from exhausting from the system, and thereafter monitoring the pressure of the gas in the system to determine if any pressure drop occurs thereby detecting potential leakage of the lubricant from said system under operating conditions.

4,027,744

PNEUMATIC PULSE HYDRAULIC CONTROLLED VALVE FOR CONTROLLING A LUBRICATING DEVICE

Herbert Kühnelt, and Rudolf Huber, both of Vienna, Austria, assignors to Hoerbiger Fluidtechnik KG, Vienna, Austria

Filed Apr. 23, 1976, Ser. No. 679,878
Claims priority, application Austria, Apr. 25, 1975, 3209/75
Int. Cl.² F01M 1/06
U.S. Cl. 184—7 F 14 Claims



1. In apparatus for controlling the delivery of pulses of compressed gas from a source of such pulses to a device which is to be actuated by such pulses, which apparatus includes a drive piston disposed in a cylinder to undergo reciprocating movement therein, a normally closed control valve disposed in a fluid conducting line arranged to be connected between such source and such device, opening of the valve, placing the source in pressure-transmitting communication with the device, and a stepping mechanism connected between the drive piston and the control valve to effect opening of the control valve in response to the reciprocating movements of the drive piston, the improvement wherein said stepping mechanism comprises: a reciprocating pump connected to be driven by said drive piston and having an input receiving a supply of liquid and a liquid output, said pump constituting means for conveying from its output a predetermined quantity of liquid upon each cycle of reciprocating movement of said drive piston; means defining an actuating cylinder containing an actuating piston and defining a first cylinder chamber provided with a liquid input connected to receive the quantities of liquid conveyed from said pump output for causing said actuating piston to undergo a unidirectional stepwise movement in said actuating cylinder in response to receipt of each quantity of liquid from said pump outlet; and actuating means operatively connected to said control valve and disposed in the path of movement of said actuating piston for opening said control valve in response to arrival of said actuating piston at a selected location along the length of said actuating cylinder.

4,027,745

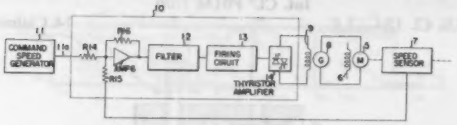
ELEVATOR SPEED CONTROL SYSTEM

Eiki Watanabe, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 11, 1975, Ser. No. 603,627
Claims priority, application Japan, Aug. 30, 1974, 49-100456
Int. Cl.² B66B 1/30
U.S. Cl. 187—29 R 8 Claims

1. An elevator speed control system comprising, in combination, an elevator car, a hoisting rope for suspending said elevator car, and a sheave engaging said hoisting rope to form a mechanical system having an angular resonance frequency

and an angular antiresonance frequency, command speed generator means for generating a command speed signal for the elevator car, speed sensor means for sensing the actual speed of said elevator car, speed control means including comparison circuit means for comparing said command speed signal with a signal for said actual speed of said elevator car,



and filter means of electrically higher order connected in said speed control means to cancel out said angular resonance and antiresonance frequencies of said mechanical system, said speed control means being operative to control said mechanical system in response to the result of the comparison made by said comparison circuit means and through said filter means.

4,027,746

CENTER-PULL TYPE CALIPER BRAKE FOR A BICYCLE

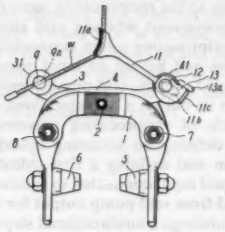
Masayoshi Kine, Sakai, Japan, assignor to Shimano Industrial Company, Limited, Osaka, Japan

Filed Aug. 16, 1976, Ser. No. 714,507

Claims priority, application Japan, Sept. 5, 1975, 50-123353[U]; Sept. 5, 1975, 50-123354[U]

Int. Cl.² F16D *65/54*

U.S. Cl. 188—24 **7 Claims**



1. A center-pull type caliper brake for a bicycle, said brake comprising:

an arm fixed to the frame member of the bicycle;

a pair of brake arms pivotally mounted on the ends of said fixed arm in freely oscillating relation through pivots, each of said brake arms having a portion which extends substantially horizontally;

a brake shoe on one end of each of said brake arms;

a control wire for operating said brake arms;

a holder, on the other idle end of one of said brake arms, for securing one end of said control wire thereto; and

a retainer pivotally mounted on the other idle end of the other one of said brake arms, said retainer having a base on one end thereof attached to the other idle end of the other one of said brake arms and an extension extending from said base toward a center line perpendicular to the horizontal portions of said brake arms, said extension having a grip for retaining an intermediate portion of the control wire.

4,027,747

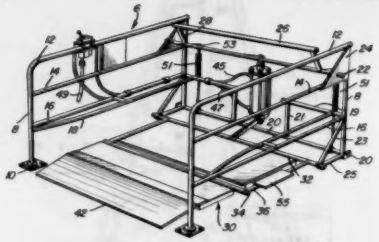
WHEELCHAIR HOLDING DEVICE FOR VEHICLES

James H. Moorman, Jr., Fort Valley, Ga., assignor to Blue Bird Body Company (Entire), Fort Valley, Ga.

Filed Feb. 10, 1976, Ser. No. 656,888

Int. Cl.² B60T *1/04*

U.S. Cl. 188—28 **7 Claims**



1. A fixture for restraining the motion of a wheelchair while it is being transported on a vehicle body, comprising means to enable an occupant of the wheelchair to readily secure the chair in a locked position including, a U-shaped rigid framework enclosure independent of the vehicle body, open at the front end, and having a pair of side support members and a rear support member adapted to be mounted on the floor of the vehicle, the open front end facing in a direction to receive a wheelchair with the propulsion wheels thereof adjacent said rear support member, means easily operable by the wheelchair occupant to hold the propulsion wheels in fixed position including a pair of spaced clamping jaws mounted on said framework moveable between an open position wherein said wheels are free, and a closed position wherein the jaws move toward one another to engage the wheels at opposed circumferential portions of the wheels, one of said jaws engaging the upper rear portion of the wheel, and the other jaw engaging the lower forward portion of the wheel to grip the wheel therebetween, and means for actuating the clamping jaws mounted on the framework.

4,027,748

BRAKING DEVICE FOR ROPES AND BELTS, ESPECIALLY LIFELINES

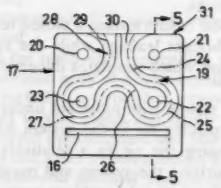
Nils Christer Persson, Ope 2790, S-831 00 Ostersund, Sweden

Filed July 7, 1975, Ser. No. 593,453

Claims priority, application Sweden, Aug. 16, 1974, 7410459

Int. Cl.² B65H *59/14*

U.S. Cl. 188—65.4 **1 Claim**



1. A rope braking device, particularly for fire escape, comprising

a. a two-piece solid block,

b. a guide channel of cylindrical cross-section in said block for a rope of cylindrical cross-section extending through the channel,

c. means for attaching a person to be suspended by the device,
d. the channel extending in a loop comprised of a number of bends having different radii of curvature,
e. said loop running in a middle plane which divides the block in two identical and separate halves united together by fastening means,
f. said bends being disposed symmetrically with respect to a central plane at right angles to the middle plane,
g. the guide channel having its both ends located at one of said ends of the block to form inlet and outlet channel portions for the rope,
h. said loop comprising a first pair of substantially identical outer bends which are convex relative to the central plane and located on opposite sides of the central plane and including at their outer end portions said inlet and outlet channel portions, whereas the inner end portions of the first pair of bends merge into the upper end portions of a second pair of inner bends which are concave relative to the central plane and at their lower end portions merge into a central bend which is convex seen from the inlet and outlet channel portions,
i. the radius of curvature being substantially greater for the first pair of bends than for the second pair of bends,
j. the outlet and inlet channel portions opening in the same direction and also being widened in the middle plane so that the rope portions located in the widened outlet and inlet channel portions may be positioned substantially parallel to each other or at any desired angle to each other until the rope portions closely follow the curvature of the first pair of bends to their outer ends.

4,027,749

LATCH SPRING ASSEMBLY FOR DISC BRAKE PAD GUIDE PINS

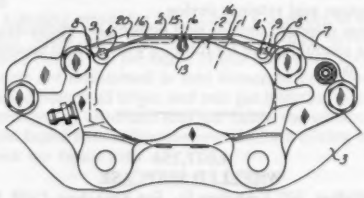
Masachika Yamamoto, Toyonaka, and Yasuhiko Taniuchi, Itami, both of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Feb. 11, 1976, Ser. No. 657,025

Claims priority, application Japan, Feb. 13, 1975, 50-20330[U]

Int. Cl.² F16D *55/228*

U.S. Cl. 188—73.3 **4 Claims**



1. A latch spring assembly for brake pad guide pins received in a disc brake caliper including an opposed pair of disc brake pad members retained between opposed caliper body walls of a disc brake caliper on a pair of spaced guide pins passing transversely through the pad members and latched for retention by a latch spring having outwardly extending legs with the ends thereof respectively received in said pins, the improvement comprising a spring retention opening through one of said opposed caliper body walls, said latch spring having a central hook extending through said opening and hooking said one wall under spring tension, a mid portion of each of said spring legs engaging said caliper body under tension relative to said hook to retain said spring ends stationary relative to the axial direction of said pins within the flexural elasticity limits of said spring legs, said legs extending generally outward in opposite directions from said hook for their entire length.

4,027,750

FLOATING DISC BRAKE INCLUDING AIR ESCAPE STRUCTURE

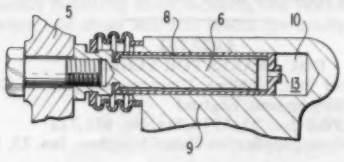
Kyoji Kawamoto, and Yosuke Ishihara, both of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Apr. 15, 1976, Ser. No. 677,470

Claims priority, application Japan, Apr. 18, 1975, 50-53301[U]

Int. Cl.² F16D *55/224*

U.S. Cl. 188—73.3 **6 Claims**



1. In a floating disc brake of the type having, a fixed member spanning said disc, a piston and a first pad positioned on one side of said disc, a caliper spanning said disc and a second pad on the other side of said disc, said caliper, piston and pads being arranged to press both pads in a direction towards said disc when said piston operates, a pair of guide pins fixed to said caliper and extending parallel to the axis of said disc and a pair of corresponding blind holes in said fixed member for slidably receiving said pins, each said blind hole having a receiving end and a blind end, the improvement comprising, at least one of said pins being enclosed in a resilient bag movable therewith, said bag having a groove therein providing an air passageway between said blind end of said blind hole and the space external to said blind hole during normal operation.

4,027,751

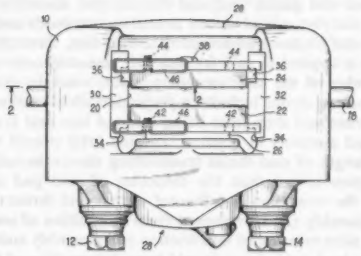
NOISE-REDUCING SPRING FOR A DISC BRAKE

Jean-Louis Gérard, Paris, France, assignor to Societe Anonyme D.B.A., Paris, France

Filed Dec. 17, 1975, Ser. No. 641,412

Int. Cl.² F16D *65/12*

U.S. Cl. 188—73.5 **8 Claims**



1. A disc brake comprising:
a rotary disc having a pair of friction faces;
a pair of friction elements each having a backing plate carrying friction linings facing respective friction faces on said disc;
a torque-taking member having actuation means urging said friction elements into engagement with the friction faces;
said torque-taking member having guiding surfaces which carry and anchor said friction elements;
at least one spring cooperating with said friction elements to resiliently urge the latter radially outwardly;
said one spring having two first arms facing respective surfaces on the backing plate and extending substantially parallel to the friction faces, at least one second arm

extending into an aperture between the surfaces on the backing plate, at least one third arm engaging the guiding surface on the torque member and at least one fourth arm engaging the backing plate;

said second arm extending from one of the first arms facing one of the surfaces to the other of the first arms facing the other of the surfaces and releasably engaging the other of the first arms facing the other surface to attach said one spring to said friction element;

said second arm and said other of the first arms being disengageable from each other to permit said second arm to withdraw from the aperture while the one of the first arms remains connected to the other of the first arms.

4,027,752

DISC BRAKES FOR VEHICLES

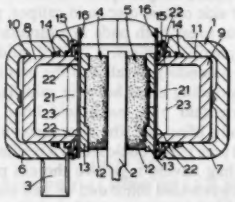
Herman Josef Brix, Koblenz, Germany, assignor to Girling Limited, Birmingham, England

Filed Jan. 23, 1976, Ser. No. 651,722

Claims priority, application United Kingdom, Jan. 23, 1975, 2916/75

Int. Cl.² F16D *55/228*

U.S. Cl. 188—73.6 **5 Claims**



1. A disc brake for a vehicle comprising a rotatable disc, a housing adjacent to said disc and having a bore arranged with the axis thereof normal to the plane of said disc, a friction pad assembly for engagement with said disc located in said housing, a piston slidably guided in said bore for applying said friction pad assembly to said disc, and a thrust transmitting device interposed between said piston and said friction pad assembly and comprising a shim of which a part is cut-out over a portion of what would otherwise be the area of contact between said piston and said friction pad assembly so that when said piston is advanced in said bore towards said disc to apply said friction pad assembly to said disc, thrust from said piston is applied to said friction pad assembly only over the remainder of the said area of contact, wherein said thrust transmitting device includes a projection which defines a stop to prevent said shim from being inserted into said brake with said pad assembly in position, and the total overall effective axial length of said thrust transmitting device including said projection is less than the thickness of said pad assembly minus the wear thickness thereof so that said thrust transmitting assembly can be removed from its position of use in said brake after removal of said friction pad assembly and without forcing back said piston in said bore, irrespective of the wear condition of said pad assembly.

4,027,753

IN-AXLE VEHICLE WHEEL SPEED SENSING DEVICE

Charles Hunter Lantz, Troy, Ohio, assignor to The B.F. Goodrich Company, Akron, Ohio

Filed Apr. 15, 1976, Ser. No. 677,215

Int. Cl.² B60T *8/08*

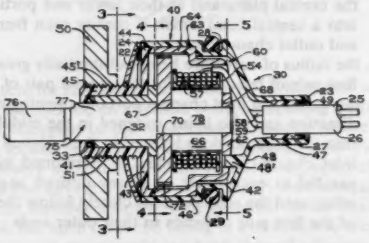
U.S. Cl. 188—181 R **6 Claims**

1. In combination

A. an axle adapted to support a wheel for rotation thereon, said axle having a cylindrical bore therein extending axially inwardly from an end of said axle;

B. a wheel speed sensor assembly disposed in sealed relationship with and entirely within said bore, said sensor assembly comprising:

1. a hermetically sealed nonmagnetic housing,
2. a ferromagnetic stator mounted within said housing, said stator having an annular portion provided with a selected number of spaced notches,
3. a rotor assembly mounted within said housing, said rotor assembly comprising
   a. a rotatable, nonmagnetic shaft and
   b. a ferromagnetic rotor
   i. secured to said shaft,
   ii. having an annular portion provided with number of spaced notches equal to said selected number, and
   iii. disposed relative to said stator so as to provide an annular gap of selected magnitude between the annular notched portion of said stator and the annular notched portion of said rotor;



4. a permanent magnet mounted within said housing and disposed to generate magnetic flux through said rotor and stator;
5. a wire coil mounted within said housing and disposed for induction of current by changing magnetic fields caused by rotation of said rotor;

C. a curved, metallic retainer device disposed

1. outside said housing
2. entirely within said bore and
3. operable, upon flattening, to lock said sensor assembly against both rotational and axial movement relative to said bore; and

D. means disposed adjacent said retainer device adapted to

1. be moved into contact with said retainer device and
2. flatten said retainer device

E. means disposed outside said housing for connecting said rotor assembly shaft for rotation with a wheel mounted on said axle.

4,027,754

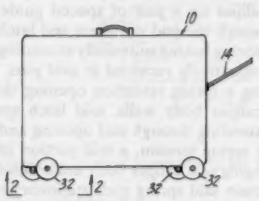
WHEELED SUITCASE

Brooks Walker, 807 Francisco St., San Francisco, Calif. 94109

Filed Feb. 26, 1976, Ser. No. 661,655

Int. Cl.² A45C *5/14*

U.S. Cl. 190—18 A **10 Claims**



1. In a suitcase having two opposed portions and provided

with a plurality of hinge structures on one side thereof for hingedly mounting said portions together,

a sleeve integrally secured to one of said hinge structures, and

a wheel assembly including an axle received in said sleeve for supporting said suitcase,

said axle being formed with an annular groove,

a detent carried by said hinge structure and received in said groove, and

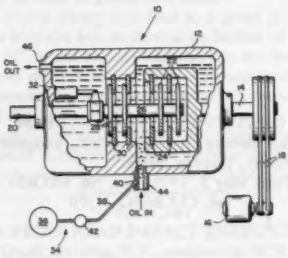
a housing surrounding said sleeve for protecting said detent.

4,027,755

APPARATUS AND METHOD FOR REDUCING DRAG BETWEEN CLUTCH OR BRAKE COMPONENTS IMMERSED IN A LIQUID

Kenneth W. Evans, Fairport; Mason M. Howlett, Penfield, and David H. Kirkpatrick, Rochester, all of N.Y., assignors to The Gleason Works, Rochester, N.Y.

Continuation of Ser. No. 339,785, March 9, 1973, abandoned.
This application Jan. 29, 1976, Ser. No. 653,332
Int. Cl.² F16D *13/72, 67/04*
U.S. Cl. 192—18 A **6 Claims**



1. In a driving mechanism of a type that includes (a) components which can be brought successively into and out of engagement with each other to effect a change in driving characteristic of said mechanism and (b) a liquid bath into which said components are continuously immersed sufficiently to provide a heat transfer liquid for cooling the components during operation of the mechanism, the improvement comprising

gas injecting means for introducing a quantity of a gas into said liquid bath to thereby reduce drag between said components and the liquid of said bath while said components are maintained in said immersed condition in said liquid bath at all times, and said gas injecting means being arranged to introduce said gas below the surface level of said liquid bath to thereby provide for a mixing of the gas with the liquid bath.

4,027,756

TRANSMISSION WITH SHIFT BLOCKER CLUTCH MECHANISMS

Robert W. Wolfe, Jackson, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Filed Mar. 15, 1976, Ser. No. 666,531
Int. Cl.² F16D *23/06*
U.S. Cl. 192—53 E **18 Claims**

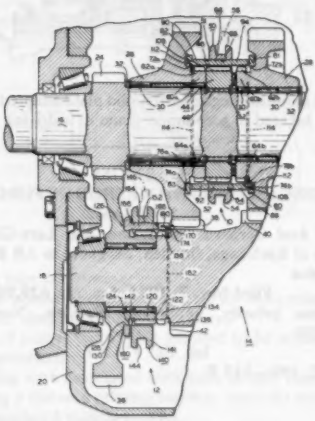
1. In an interengageable toothed clutch system, the combination comprising:

a. first rotatable means having a collar member mounted thereon in axial sliding relationship and positive rotation therewith, said collar member having a first clutch portion with first clutch teeth;

b. second rotatable means, coaxially related to said first rotatable means and axially fixed relative thereto, having a second clutch portion with second clutch teeth arranged thereon for interengagement with said first clutch teeth upon relative movement of said first clutch portion relative to said second clutch portion;

c. blocker means coacting with said first clutch portion and said second rotatable means for positively preventing engagement of said clutch teeth so long as a substantial difference in relative rotational speed exists between said first and second rotatable means, said blocker means including an annular blocker ring having a plurality of axially projecting struts, with said struts having blocking portions thereon;

d. some of said first clutch teeth being provided with spaces therebetween capable of receiving therethrough said axially projecting struts, including said blocking portions, when said struts and said spaces are axially aligned to



permit said blocking portions to relatively move axially into said spaces so that said clutch teeth can be engaged with one another; and

e. a surface on one of said blocker ring and ends of said struts removed from said blocker ring frictionally cooperating with a surface on said second rotatable means for offsetting said blocker means with respect to said first rotatable means whenever and for so long as a substantial difference in relative rotative speeds exists between said respective clutch portions, said blocking portions interfering with an annular side surface of said first clutch portion when said blocker means is circumferentially offset relative to said collar member so as to prevent engagement of said clutch portions.

4,027,757

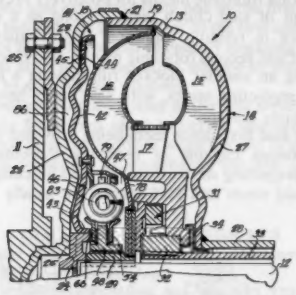
COMPACT VIBRATION DAMPER

Edmund John Radke, Mount Clemens, and Joseph Louis Bair, Royal Oak, both of Mich., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 19, 1975, Ser. No. 642,508
Int. Cl.² F16D *3/66*
U.S. Cl. 192—106.2 **10 Claims**

1. A vibration damper for a clutch for a hydrodynamic device, comprising a hub having a flange, a plate assembly including a pair of plates disposed on opposite sides of said flange and spaced therefrom, said flange and plates each

having means defining a plurality of openings, resilient means disposed in each of said openings, and circumferentially



spaced mounting legs on each said plate adapted to be secured to and located in a common plane of a driving member.

4,027,758

WET DISC CLUTCH AND METHOD OF FORCE COOLING THE SAME

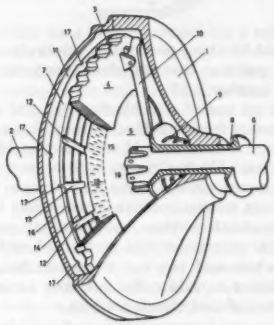
Värne Axel Gerhard Gustavsson, and Lars-Göran Moberg, both of Karlskoga, Sweden, assignors to AB Bofors, Bofors, Sweden

Filed Nov. 7, 1975, Ser. No. 629,954

Claims priority, application Sweden, Nov. 15, 1974, 7414359

Int. Cl.² F16D *13/72*

U.S. Cl. 192—113 B **12 Claims**



1. A method of force cooling a rotatable wet disc clutch, of the type having a pair of relatively movable discs which are provided with friction surfaces coupled to and disposed centrally around the input and output shafts of the clutch, during the slipping-in and subsequent engagement of said friction surfaces, said method comprising the steps of continuously feeding a pressurized cooling liquid into the region between the friction surfaces of the discs along evenly distributed radial distribution grooves provided in the surfaces of the discs, said radial distribution grooves extending from the inner edges of the discs nearest the input and output shafts across part of the width of the discs but not across their entire width, passing the cooling liquid from said radial distribution grooves through a plurality of cooling grooves which emerge from the radial distribution grooves and which are evenly distributed in the friction surfaces of the discs in directions generally parallel to the direction of rotation of the clutch, passing the cooling liquid from the cooling grooves into conveying grooves communicating with the cooling grooves and arranged radially between the radial distribution grooves, the conveying grooves extending across part of the width of the discs but not all the way to their inner edges, and passing the cooling liquid through said conveying grooves to constricted outlets adjacent the outer edges of the discs, said distribution grooves, when the clutch is engaged, being kept constantly filled with said cooling liquid under pressure, said constricted outlets causing the conveying grooves at the same time to be kept entirely filled with cooling liquid flowing from the cooling grooves, whereby the cooling liquid passing through said distribution grooves and said cooling grooves is forced to overcome the counter-pressure arising in the conveying grooves resulting from the filling of the conveying grooves with liquid due to said constricted outlets, the pressure in the cooling liquid which is fed to the distribution grooves being so selected that its said pressure together with the influence of centrifugal force on the cooling liquid produced by rotation of the clutch is capable of forcing cooling liquid in a sufficient and evenly distributed quantity through all the grooves in the disc surfaces of the clutch in sequence to produce the desired cooling effect.

4,027,759

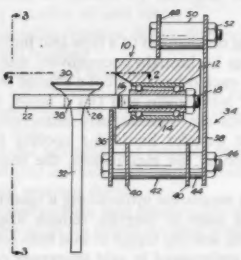
GRAVITY CONVEYOR SYSTEM

Walter H. Van Deberg, Berkley, Mich., assignor to F. Jos. Lamb Company, Warren, Mich.

Filed May 5, 1976, Ser. No. 683,631

Int. Cl.² B65G *11/00*

U.S. Cl. 193—1 **14 Claims**

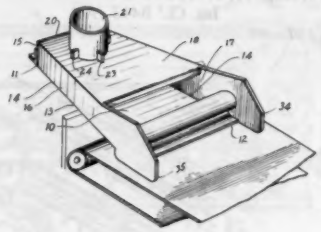


1. A conveying system for workpieces of the type having a head and a depending stem portion of narrower cross section than said head comprising, a downwardly inclined chute assembly through which work support carriers are adapted to roll by gravity, said chute assembly including means forming a downwardly inclined support surface and lateral guide surfaces for causing the work carriers to roll along a predetermined path, each work carrier comprising a roller having cylindrical outer surface supported by the support surface of the chute assembly for rolling movement thereon and having radially extending faces adapted to be engaged by the guide surfaces on the chute assembly to guide the roller laterally, means providing an anit-friction bearing on said roller at the central rolling axis thereof, and an arm supported by said bearing and being rotatable relative to said roller, said arm extending laterally outwardly at one end of said roller beyond said support and guide surfaces so that the arm laterally overhangs said chute assembly at one side thereof, the free end portion of said arm being apertured to receive the stem of a workpiece, said apertured end portion being adapted to engage the underside of the head of the workpiece with the stem thereof extending downwardly through said aperture so that the workpiece is supported in a vertically oriented position.

4,027,760
FEED BOX FOR LIQUID-SOLID MIXTURES

Robert L. Somerville, Old Amwell Road Rte. 1, Box 256, Neshanic, N.J. 08853

Filed Sept. 30, 1975, Ser. No. 618,075
Int. Cl.² B65G 11/08
U.S. Cl. 193—2 R 3 Claims



3. A sludge, slurry or liquid feeding device comprising a head box with inlet means for said feed,

sides and bottom to guide said feed,

an open end to direct said feed to a point of disposition,

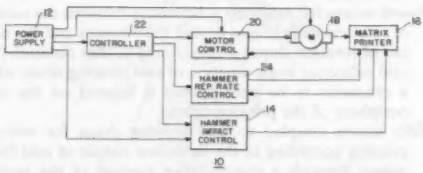
means to hold the box bottom at an incline of about 22½ to about 60° to the horizontal, whereby the feed flows from said inlet down said incline to develop some velocity,

means terminating the bottom of the box transversely at the end of the incline in an upwardly directed arcuate lip to flip sludge upwardly, and a corresponding arcuate arrangement substantially semi-circular and spaced above said lip to reverse the direction of flow of sludge.

4,027,761
MATRIX PRINT HEAD IMPACT ENERGY CONTROL

Richard S. Quaif, Dryden, N.Y., assignor to NCR Corporation, Dayton, Ohio

Filed Oct. 21, 1975, Ser. No. 624,502
Int. Cl.² B41J 3/04
U.S. Cl. 197—1 R 12 Claims



1. In a matrix printer having at least one print head containing one or more print elements energized by a pulsed drive signal for printing matrix characters in accordance with character data as the printing head is moved across a printing medium, a print element drive control circuit supplied with electrical power from a power supply for varying said print element drive signal in accordance with variation of the power supply output voltage comprising:

means for generating a variable frequency clock signal whose frequency varies directly with the speed of movement of the printing head;

a summing amplifier for sensing the output voltage of said power supply and a reference voltage;

means responsive to said clock signal for deriving a plurality of synchronized trigger signals of the same frequency as said clock signal at different phases;

character data source coupled to a plurality of output registers;

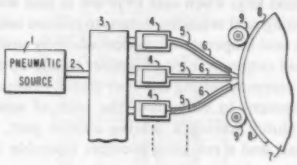
means responsive to said trigger signals for pulse width modulating the output of said summing amplifier to drive a pulse drive signal;

and means for selectively coupling said pulse drive signal through said output registers for simultaneously energizing said print elements at each of said print heads in accordance with said data coupled to the output register associated with each of said print heads respectfully.

4,027,762
DOT PRINTER

Shunsaku Nakauchi, Mitaka, Japan, assignor to Kokusai Gijutsu Kaihatsu Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 11, 1974, Ser. No. 522,962
Claims priority, application Japan, Nov. 10, 1973, 48-125932; Nov. 21, 1973, 48-130076; Dec. 26, 1973, 48-143983
Int. Cl.² B41J 23/20
U.S. Cl. 197—1 R 12 Claims



1. A dot printer comprising:

a pneumatic pressure source containing air compressed to a pressure higher than atmospheric pressure;

a plurality of pneumatic motors adapted to be actuated by the compressed air;

a dot-printing wire associated with each of said motors for imprinting a dot on a printing medium upon the actuation of the associated motor;

first electrically operated valve means for selectively permitting the transmission of the compressed air from said source to selected individual ones of said motors only in response to an electric signal representing a desired character pattern, whereby the selected motors are actuated to imprint the desired character pattern on the printing medium; said valve means comprising a plurality of first valves pneumatically coupled to respective ones of said plurality of motors and operated only in response to the electric signal to permit the transmission of the compressed air; and

second electrically operated valve means, coupled between said pneumatic source and said plurality of first valves and normally blocking the transmission of compressed air from said source to said first valves, for transmitting compressed air from said source simultaneously through all of the operated said first valves only after they are operated, and thence to said selected motors.

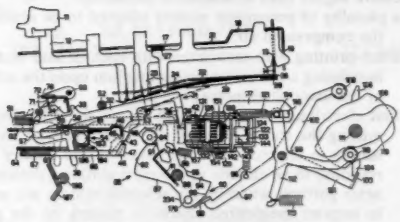
4,027,763
KEYBOARD FOR OFFICE MACHINES

Rinaldo Salto, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Continuation of Ser. No. 531,719, Dec. 11, 1974, abandoned. This application Aug. 2, 1976, Ser. No. 710,671
Claims priority, application Italy, Dec. 14, 1973, 70699/73
Int. Cl.² B41J 23/02
U.S. Cl. 197—16 24 Claims

1. A keyboard for a typewriter, teleprinter, calculator and similar office machines comprising: a series of keys each movable from a rest position to a working position: a group of code-bars movably supported along a predetermined trajectory; spring means connected to said code bars for pulling said code-bars along said trajectory from a rest position to an active position; bridge means for controlling said code-bars against the action of said spring means; a series of setting

elements associated with said keys, each one of said setting elements being selectable by an associated one of said keys when said key is moved to said working position; a common setting member movably supported between an inoperative position and an operative position, said common setting member when in its operative position being engageable with said selected one of said setting elements to move said selected one of said setting elements into the trajectory of said code-bars, and means for causing a light load upon said selected setting element when another key is moved to said working position in unacceptably rapid succession to a first key, said means for causing a light load comprising a setting spring connected to said common setting member for causing movement of said common setting member from said inoperative position toward said operative position; releasing means normally arresting said common setting member in said inoperative position against the action of said setting spring; means operated by said keys when said keys are in said working position for operating said releasing means to release said setting member from said inoperative position whereby said setting spring moves said common setting member to said operative position and said common setting member thereby causes said selected setting element to move into the path of said code-bars; a starting clutch having a driving motive part, an actuatable driven part and a releasing member operable for connecting



said driving motive part to said driven part; an intermediate member connecting said common setting member to said releasing member for operating said releasing member to connect said driving motive part to said driven part when said common setting member moves toward said operative position; reloading means operated by said driven part of said starting clutch for returning said common setting member from said operative position to said inoperative position against the action of said setting spring; sensing means for sensing the selection of another of said setting elements by another said key moved to said working position while said common setting member is in the operative position; said sensing means being interconnected with said common setting member to permit said common setting member to engage said other of said setting elements only immediately after said common setting member returns to said inoperative position; and cam means operatively connecting the driven part of said starting clutch with said bridge means for positioning said bridge means with respect to said code-bars to control movement of said code-bars between said rest position and said active position so that said one and said other of said selected setting elements arrests in two following cycles some of said code-bars, against the action of said spring means, according to the coded combination corresponding to said one and said other key moved in said working position.

4,027,764

APPARATUS FOR CONFIRMING THE CORRECT IMPRESSION OF PRINTING CHARACTERS

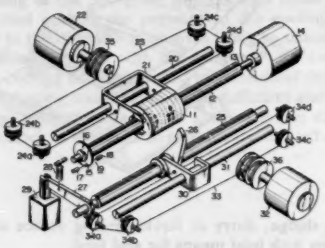
Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed June 22, 1976, Ser. No. 698,313

Claims priority, application Japan, June 24, 1975, 50-77871; Aug. 11, 1975, 50-97349

Int. Cl.² B41J *1/04*

U.S. Cl. 197—49 **6 Claims**



1. Apparatus for confirming a correct impression of printing characters in which the rotation angle of an axially movable, stepwise rotatable, printing drum on the outer surface of which at least one group of characters is arranged is so controlled that a designated character on the outer surface of the printing drum confronts a predetermined printing position on a recording medium for printing, said apparatus comprising:

first means for defining at least one rotational reference angle position of the printing drum at a given reference angle;

second means for designating the number of rotation steps required to cause a desired character on the outer periphery of the printing drum corresponding to a distance from said reference angle position of the printing drum to confront the recording medium;

third means for storing the number of said designated rotation steps;

fourth means for detecting a difference between the number of rotation steps stored in said third means and the number of rotation steps corresponding to that distance from said reference angle position of said rotating drum where a character to be next printed is located on the outer periphery of the printing drum;

fifth means coupled to said printing drum for effecting printing according to the detection output of said fourth means through a cummulative control of the rotation angle of said printing drum while sequentially and axially moving the printing drum;

sixth means for returning said printing drum to said reference angle position after printing is completed in a line on the recording medium; and

seventh means for checking a printing error for each line on the recording medium by comparing the number of rotation steps required for the printing drum to be returned to said reference angle position and the number of rotation steps corresponding to a distance from said reference angle position to that position at which the last character is to be printed in each line on the recording medium.

4,027,765

RECORD MEDIA DRIVE MECHANISM

Leslie L. Crump, and Victor J. Italiano, both of Trumansburg, N.Y., assignors to NCR Corporation, Dayton, Ohio

Filed July 31, 1975, Ser. No. 600,699

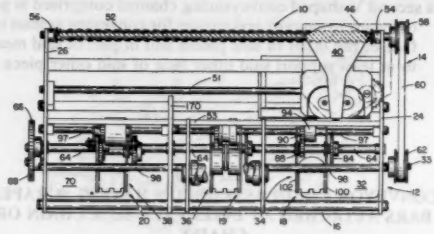
Int. Cl.² B41J *15/00*

U.S. Cl. 197—133 R **18 Claims**

1. Record media drive mechanism for accommodating a plurality of printing stations, at least one of said stations being

a receipt station, a journal station, or a form station, said mechanism comprising a drive member extending in juxtaposition past said plurality of printing stations,

modular means including roller means operably connected with said drive member for advancing record media in one direction of travel at one of said printing stations, said



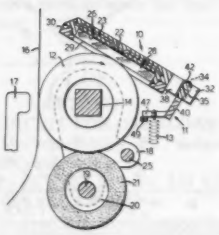
modular means including side frame members for journaling said drive member and for containing said roller means, and means engaging with said side frame members for supporting and along which said modular means is movable thereby permitting operation of said modular means at another printing station.

4,027,766

INKING DEVICE FOR THE TYPE-CARRIER ELEMENT OF A CALCULATING MACHINE

Enrico Sargentini, Turin, and Ugo Carena, Ivrea (Turin), both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed July 8, 1975, Ser. No. 594,155
Claims priority, application Italy, July 15, 1974, 69241/74
Int. Cl.² B41J *35/02, 35/26*
U.S. Cl. 197—151 **6 Claims**



1. A device for inking the type-carrier element of a calculating machine or similar office machine of the type in which the type-carrier element includes a wheel having an edge with protruding characters and support means for effecting the rotation of said wheel to select a desired character and for effecting the movement of said wheel along a printing line to define the various writing positions of said wheel, the device comprising:

a container having a long window substantially the same length as the printing line;

an ink deposit element in the container;

a permeable, wear-resistant layer covering the ink deposit element at the window and in contact with the deposit element to permit the outflow of the ink;

a spring element for biasing said permeable layer tight against the type-carrier element during the rotation and movement of the wheel;

a support member connected to the office machine:

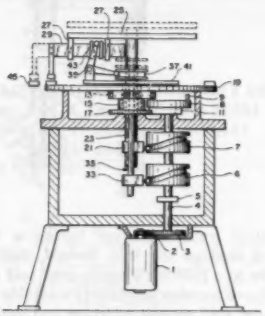
mounting means for removably mounting said container to said support member, said mounting means comprising stationary hooking means for hooking on said support and movable hooking means for hooking on said container and movable with respect to and into engagement with the stationary hooking means, wherein said stationary hooking means includes a pair of hooks and wherein said movable hooking means includes a flexible cross-bar having two ends each cooperative with one of said pair of hooks and means connecting the cross-bar to said container including intermediate ribs.

4,027,767

INDEXING MACHINE TRANSFER MECHANISM

William Gluck, P.O. Box 336, Monroeville, Pa. 15146

Continuation of Ser. No. 456,819, April 1, 1974, abandoned.
This application July 24, 1975, Ser. No. 598,623
Int. Cl.² B23Q *7/02*
U.S. Cl. 198—339 **7 Claims**



1. In combination with an indexing machine of the type wherein various mechanical operations are performed on articles at workstations about a worktable rotatable about a center, the improvement which comprises:

a. a transfer means for picking up and placing the articles on the worktable;

b. a support means mounted on the indexing machine and in operative engagement with a drive shaft below the worktable for operation within the periphery of the worktable and penetrating the plane of the worktable for reciprocating the transfer means; and

c. a projection means mounted on the indexing machine in operative engagement with a drive shaft below the worktable for operation within the periphery of the worktable and penetrating the plane of the worktable within the periphery of the worktable for oscillating the transfer means between a first point beyond the periphery of the worktable and a second point within the periphery of the worktable, whereby the reciprocating action of the support means and the oscillating action of the projection means combine with the pickup action of the transfer means.

4,027,768

LOW LEVEL AUGER SPOUT

Richard R. Riessen, R.R. No. 1, Walcott, Iowa 52773

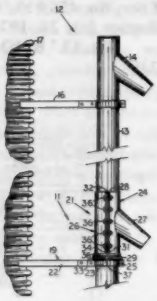
Filed Jan. 12, 1976, Ser. No. 648,427
Int. Cl.² B65G *33/14, 47/46*
U.S. Cl. 198—370 **6 Claims**

1. An auger spout for use with vertical truck conveyors, the vertical truck conveyor being attached to a grain bin, the vertical truck conveyor having at the upper end thereof a down spout, the grain flowing out of the grain bin passing upwardly through the vertical truck conveyor and out through the down spout, said auger spout comprising:

a sleeve member, said sleeve member being detachably affixed to the vertical truck conveyor, said sleeve member being slidable along the length of and rotatable about the

vertical truck conveyor, said sleeve member having a first aperture formed through the side thereof;

a spout affixed to said sleeve member, said spout being affixed over said first aperture, said spout extending downwardly and angularly from said sleeve member, said sleeve member including elongated front and rear sleeve halves, said first aperture being formed through said front sleeve half, said spout being affixed to said front sleeve half over said first aperture, said sleeve halves being detachably joined along the longitudinal edges thereof, said spout being carried by said sleeve member; and



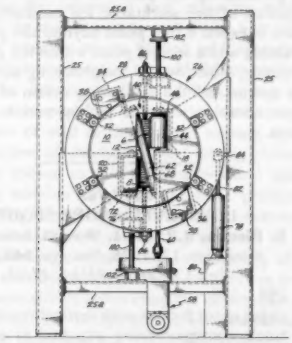
the vertical truck conveyor having a second aperture formed through the side thereof, said sleeve member slidable to a position directly over said second aperture, said sleeve member selectively rotatable to align said first aperture, said second aperture and said spout, whereby the grain is made to flow out of the vertical truck conveyor through said spout, said sleeve member slidable to a position completely away from said second aperture, whereby access to and through said second aperture is facilitated.

4,027,769

MACHINE FOR CONVEYING SECTOR SHAPED PIECES

Earl Dean Hasenwinkle, and Frank Wislocker, both of Longview, Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.

Filed Jan. 7, 1976, Ser. No. 647,031
Int. Cl.² B65G *37/00*
U.S. Cl. 198—570 **12 Claims**



1. An apparatus for supporting and longitudinally conveying a pair of elongated similarly sized sector-shaped pieces in an orientation where said pieces are spatially offset from one another such that an apex of one piece is directed toward an apex of the other with the angles of said apexes being substantially similar and with at least one face of each piece being substantially parallel with the corresponding other face comprising:

a first V-shaped conveyancing channel comprised in part of means to support and engage for conveying at least one face of one of said pieces and in part of means to at least support said other face of said one piece, and further in part of means to support a base of the piece, and

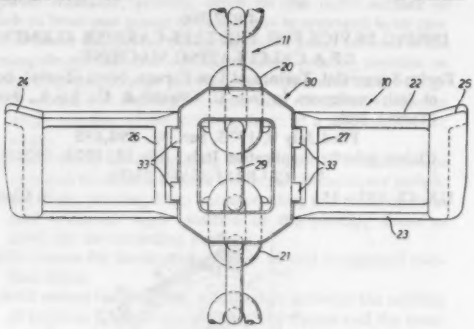
a second V-shaped conveyancing channel comprised in part of means to support and engage for conveying at least one face of the other of said pieces and in part of said means to at least support said other face of said other piece.

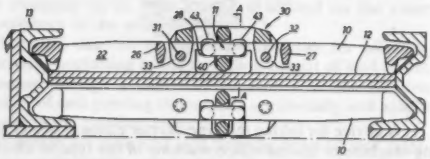
4,027,770

CONVEYOR CHAIN ASSEMBLIES HAVING SCRAPER BARS ATTACHED AT INTERVALS TO A CHAIN OR CHAINS

Paul Arthur Collier, Rock, near Kidderminster, England, assignor to Rellico Engineering Limited, Rock near Kidderminster, England

Filed Aug. 13, 1975, Ser. No. 604,269
Claims priority, application United Kingdom, Sept. 2, 1974, 38273/74
Int. Cl.² B65G *19/00*
U.S. Cl. 198—728 **6 Claims**





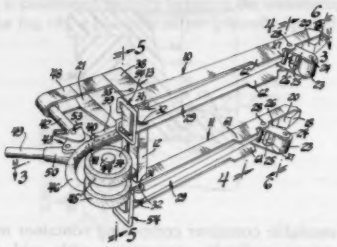
1. A conveyor chain assembly comprising, in combination, at least one endless chain in upper and lower runs, scraper bars attached at intervals along said chain, and a deck separating said upper and lower runs, each said bar having attachment means associated with a three link length of said chain to attach said bar to said chain, said three link length comprising two outer links and an intermediate link, said attachment means embracing said outer links and allowing articulation of said outer links relative to said bar whereby said chain may pass round a sprocket, wherein the planes of said outer two links are parallel to said deck, and further comprising a main frame part and an upper frame part to each scraper bar, said parts being secured together with said outer links restrained therebetween, and further comprising slots defined in said main frame part at a side thereof remote from said deck, said outer links being received in said slots and restrained therein by said upper frame part, and wherein said slots increase in depth towards the sides of said main frame part in the direction of said chain whereby to allow said articulation.

4,027,771

PALLET TRUCK FOR USE WITH FORK LIFT TRUCK

Thomas F. Adams, 28334 Ridgebrook Road, Farmington Hills, Mich. 48024

Filed May 8, 1975, Ser. No. 575,971
Int. Cl.² B66F 9/12
U.S. Cl. 214—621 19 Claims



1. In a pallet truck having a pair of forks for movement under a palleted load, and wherein said forks are provided with movable load rollers and said pallet truck includes means for moving the load rollers between a raised position and a lowered position, the combination comprising:

a. each of said forks being hollow and open on at least one of its ends for the insertion of a fork lift into the fork for lifting the pallet truck and moving the same;

b. fork lift tine retainer means operatively associated with each of the pallet truck forks for retaining each fork on a fork lift tine inserted into the fork; and,

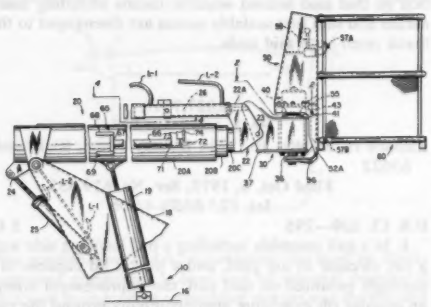
c. said fork lift tine retainer means including a looped member operatively associated with said means for moving the load rollers between a raised position and a lowered position, so as to move the retainer means to an inoperative position when the load rollers are in a raised position, and to an operative position when the load rollers are in a lowered position.

4,027,772

PROTECTIVE CIRCUIT FOR OVERLOAD SENSOR

Eugene L. Garber, McConnellsburg, Pa., assignor to Fulton Industries, Inc., McConnellsburg, Pa.

Filed Apr. 17, 1975, Ser. No. 568,932
Int. Cl.² E02F 3/84
U.S. Cl. 214—762 15 Claims



1. In combination:

a load supporting boom, means including control circuit means comprising boom load increasing circuit means and boom load decreasing means for increasing and decreasing the loading of said boom,

a boom deflection detector comprising overload switch means and means for actuating said overload switch means upon excess deflection of said boom,

further circuit means connected to said overload switch means for interrupting said boom load increasing circuit means upon actuation of said overload switch means,

said further circuit means comprising means for maintaining said boom load increasing circuit means in interrupted condition independently of said state of said overload switch means, and

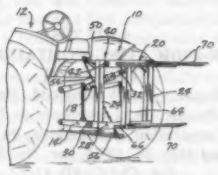
additional circuit means including re-set means for restoring said interrupted boom load increasing circuit means only upon movement of said overload switch means from the state thereof corresponding to the excess boom deflection state thereof and actuation of said re-set means.

4,027,773

BALED HAY LOADING AND TRANSPORT DEVICE

John B. Kenworthy, R.R. 4, Ottumwa, Iowa 52501

Filed Nov. 11, 1975, Ser. No. 631,147
Int. Cl.² B60P 1/00
U.S. Cl. 214—766 7 Claims



1. A baled hay handling device comprising,

a frame having mounting means for connection to tractor lifting and stabilizer arms,

a hay-carrying arm pivotally connected to said frame for pivotal movement in a plane parallel to said frame,

a trio of hay-engaging fingers on said hay-carrying arm extending perpendicular to said arm and spaced in triangular relationship,

a lifting lever arm connected to said hay-carrying arm at said pivot to said frame and extending in substantially the opposite direction whereby a downward force applied to said lifting lever arm will cause said hay-carrying arm to be pivoted upwardly, and

said hay-carrying arm including a perpendicular downwardly extending portion intermediate the ends of said arm whereby said hay-carrying arm is T-shaped and said fingers are positioned on opposite ends of said hay-carrying arm and at the outer end of said arm portion.

4,027,774

RUBBISH CONTAINER

Leopold J. Cote, 17 Clifton St., Cambridge, Mass. 02138

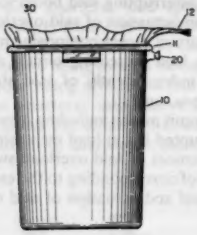
Filed July 22, 1975, Ser. No. 591,187
Int. Cl.² B65D 25/16; B65B 67/12
U.S. Cl. 220—63 R 6 Claims

1. A container comprising:

a. a trash can having a rim about the mouth thereof;

b. a flexible plastic liner disposed within said trash can to receive rubbish therein, having an edge thereof tightened about the rim and twisted to form an ear

c. a notched member cooperating with the rim of said trash can arranged to receive the ear of the flexible plastic liner



and hold the flexible plastic liner detachably and securely in an open configuration.

4,027,775
TAMPER-INDICATING CONTAINER AND LID THEREFOR

Leonard T. Mygatt, Jr., Wallingford, Pa., and Edward E. Goldsmith, Passaic, N.J., assignors to National Packaging Associates Corporation, Wallingford, Pa.

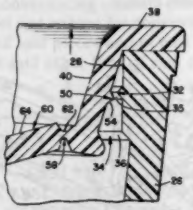
Filed May 28, 1975, Ser. No. 581,577
Int. Cl.² G65D *41/32*
U.S. Cl. 220—266 **13 Claims**

1. A tamper-indicating container and lid combination, comprising a container including a continuous sidewall having at its upper end a rim forming an open mouth; a lid including a central portion for removably closing the mouth of said container, and having a peripheral skirt extending downwardly from the periphery of said central portion and firmly engaging the exterior of said container below said rim; and that improvement comprising a guard flange formed about said sidewall and integrally therewith immediately below said skirt, with small clearance or no clearance between said guard flange and the bottom edge of said skirt, said guard flange extending away from said sidewall outwardly beyond said skirt whereby said guard flange shields the bottom edge of said skirt from forces which would otherwise remove said lid, said guard flange including a minor portion thereof comprising a removable section having a weakened part and a major portion thereof comprising a non-removable section, whereby said removable section may be removed to unshield a portion of said bottom edge of said skirt and thereby permit removal of said lid, and the non-removable section of guard flange being retained to guard a major portion of the bottom edge of said skirt if said lid is replaced during reuse of said container.

4,027,776
RECLOSEABLE CONTAINER

David Douglas, Indian Wells, Calif., assignor to Avon Products, Inc., Indian Wells, Calif.

Filed July 31, 1975, Ser. No. 600,274
Int. Cl.² B65D *43/10*
U.S. Cl. 220—281 **16 Claims**



1. A resealable container comprising container means and closure means sealingly cooperating with said container means, said container means having a sidewall with at least one open end portion defining an opening, said open end portion having first sealable means for enabling the formation of two separate and positive seals substantially about the periphery of said open end portion, said closure means including, in integral combination, a generally peripheral shoulder portion being seated on said open end portion, a flange portion connected to said shoulder portion and defining second sealable means for sealingly interfitting and cooperating with said first sealable means to provide the two separate and positive seals, said second sealable means including bead means sealingly interfitting and cooperating with said first sealable means for defining one of said two seals, and flexible means for enabling quick and easy disengagement and engagement of the two separate and positive seals formed by said first and second sealable means, said flexible means includes a generally displaceable actuating means and toggle hinge means including a web portion having a thickness less than the adjacent actuating means and bead means and being arranged to be centrally interconnecting said displaceable actuating means to said bead means, such that in response to downward displacement of said actuating means said toggle hinge means including a web portion increases the effective diameter of said bead means so that said bead means engages said first sealable means, said bead means whenever engaged with said first sealable means in the assembled position forms one of said two seals and said toggle hinge means including a web portion enables said bead means to have the effective diameter thereof decreased in response to further downward displacement of said actuating means from the assembled position so that said second sealable means including said bead means and said first sealable means are disengaged to thereby break open both said seals.

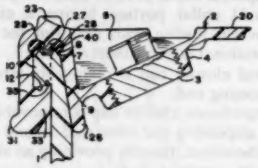
4,027,777
PAIL ASSEMBLIES

Richard H. Blanke, Jr., 1224 Dubray Court, Kirkwood, Mo. 63022

Filed Oct. 6, 1975, Ser. No. 619,633
Int. Cl.² B65D *41/06*
U.S. Cl. 220—295 **5 Claims**

1. In a pail assembly including a pail having a side wall with a rim circular in top plan, and a plastic lid capable of being sealingly mounted on said pail, the improvement comprising an annular rib extending uninterruptedly around the pail rim, a plurality of peripherally spaced pail lugs on and integral with said side wall adjacent the said rim, each of said pail lugs having a rib parallel to, in the same plane with, and spaced outwardly radially from the uninterrupted rib of the rim, and, along its lower surface at one end an inclined cam surface tending away from said rim; said lid having an internal annular skirt on, integral at and along its upper edge with and depend-

ing from said lid, and of a shape and outside diameter complementary to the inside surface of the pail side wall adjacent said rim for engaging one another snugly when said lid is mounted on said pail, annular flange integral with said lid, spaced outwardly radially of said skirt and defining with said skirt a channel having a closed bottom wall and an open mouth, said bottom wall having an annular nose, projecting from the bottom wall toward the open mouth, which, when the lid is mounted, is positioned radially between the uninterrupted rim rib and the lug rib, a plurality of peripherally spaced radially



inwardly extending flange lugs integral with said flange and spaced outwardly from said closed bottom wall toward said open mouth, of a peripheral length less than the space between successive pail lugs with which said flange lugs are to engage, said flange lugs having a bearing surface extending radially inwardly and shaped and positioned to engage a pail lug bearing surface, said nose, side walls of the flange and skirt bottom wall defining a gasket seat, and an annular gasket seated in said seat, said gasket being compressed between said nose and said ribs when the lid is mounted on the pail.

4,027,778

CONTAINER FOR FOODSTUFFS OR THE LIKE

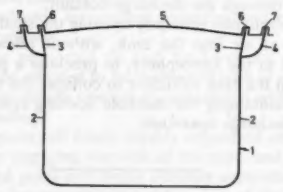
Earl Silas Tupper, Panama City, Panama, assignor to Tupl (Panama) S.A., Panama City, Panama

Filed Dec. 15, 1975, Ser. No. 641,112

Claims priority, application United Kingdom, Dec. 19, 1974, 54988/74

Int. Cl.² B65D *43/06, 43/08*

U.S. Cl. 220—354 **9 Claims**



1. The combination of (A) a container for food or drink, said container comprising a base and an integral peripheral wall, said wall having a free upstanding rim around the top and a member conncted to said wall below said rim and extending away from the wall and thence upwardly, terminating in a free upstanding upper edge, to define a moat therewith, and (B) a lid having structure defining a seal both (a) with the said rim of the container around the top of the peripheral wall and (b) with the said upper edge of the upwardly extending member defining the moat or channel.

4,027,779

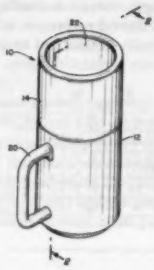
SERVING CONTAINER FOR HOT LIQUIDS

Carol De Long, 5938 Cahuenga, North Hollywood, Calif. 91601

Filed Aug. 11, 1975, Ser. No. 563,177

Int. Cl.² A47G *19/22;* **B65D** *21/02*

U.S. Cl. 220—23.83 **1 Claim**



1. A serving container comprising:

a first container having a single access opening therein, said access opening providing an access into a liquid retaining chamber, said first container having a lip surrounding said access opening, said first container including a handle;

a second container having a first compartment and a second compartment, a common wall separating said first compartment and said second compartment, said first and second compartments being substantially equal in volume with their volume being approximately one-half of said liquid retaining chamber of said first container, said common wall being integral with said second container; and

means connected to the wall of said second container in the area of said second compartment for interconnecting with said first container, whereby said second container is adapted to be placed upon said first container with said means interlocking said second container with said first container to form a single unit, said means comprises an annular flange and an annular shoulder, with said second container placed upon said first container said annular flange extending within the confines of said first container and said annular shoulder resting upon the lip of said first container, with said second container placed upon said first container said first compartment being capable of containing a tea bag as well as other items while said common wall essentially closes said access opening of said first container, thereupon said second container may be removed from said first container after removal of the contents from said first compartment and said second container be inverted and placed upon a planar supporting surface with the said second compartment being capable of containing items such as the used tea bag.

4,027,780

PAPER THROWER

Robert J. Dikman, 1811 1/2 Shore Drive South, South Pasadena, Fla. 33707

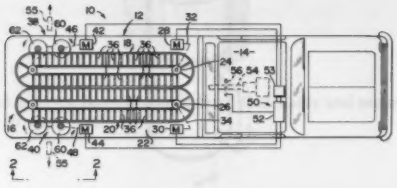
Filed Aug. 1, 1975, Ser. No. 601,084

Int. Cl.² G06F *15/50*

U.S. Cl. 221—7 **7 Claims**

1. An object delivery system used in combination with a mobile supporting platform, said delivery system comprising: carrying means movably mounted on said mobile platform, said carrying means configured to carry a plurality of predetermined objects thereon; delivery means comprising at least one pair of opposing discs disposed in communicating relation to said carrying means; carrier drive means connected in driving relation to said carrying means; said mobile platform comprising a drive assembly connected thereto to receive power from a power source and disposed to drive said mobile

platform and cause movement thereof; control means interconnected between said drive assembly of said mobile platform and said carrier drive means; encoder means mechanically attached to said drive assembly, said encoder means physically and electronically configured to translate mechanical movements of said drive assembly into electrical pulses, said encoder means being electrically connected in pulse-communicating relation to said control means; said control means comprising logic means including reference storage facility containing prestored reference information and comparator means electrically connected to said logic means, said



comparator means connected in circuitry to said encoder means whereby said comparator means compares incoming data from both said encoder means and said storage facility; and indicator means mounted on said platform and electrically interconnected to said control means, said indicator means elelctrically configured for actuation upon signal response defined by a predetermined occurrence, whereby activation of said carrying means and said delivery means automatically occurs on a periodic basis dependent upon a predetermined length of travel of said drive assembly of said mobile platform and the resulting speed of operation of said drive assembly.

4,027,781

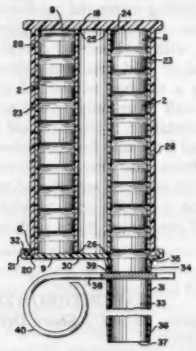
PRIMER FEED CARTRIDGE

John S. Covert, 320 E. Nettleton, Independence, Mo. 64050

Filed Mar. 17, 1976, Ser. No. 667,511

Int. Cl.² B65H *3/32*

U.S. Cl. 221—105 **3 Claims**



1. A primer container for automatically feeding primer caps into a shell reloading tool, said container comprising:

a. a cylindrical body having a closed end, a central axis, and a dispensing end, said body dispensing end includes an interior circumferential rim;

b. a first closure cap fixedly attached to said body closed end;

c. a second closure cap rotatably mounted to said body dispensing end;

d. a storage magazine member disposed within said container and including a plurality of mutually parallel, elongated, receptacles spaced radially equidistantly from the central axis of said body, each of said receptacles having interior cross-sectional dimensions slightly larger than a primer cap dimensions and being adapted to slidingly receive therein a plurality of stacked primer caps;

e. said second cap includes a centrally apertured dispensing spout being disposed therein for selected rotational registry with said storage member receptacles and being adapted for gravitationally transmitting said primer caps from said container to a press portion of said shell reloading tool;

f. said second closure cap includes a flat circular portion and a peripheral collar portion attached perpendicularly thereto, said collar portion having a circumferential groove therein mating with said rim for cooperating, sliding, rotational contact therewith;

g. said second closure cap is removably attached to said body dispensing end;

h. a third imperforate closure cap is removably attached to said body dispensing end when said second closure cap is removed therefrom, thereby providing an airtight storage seal for said container; and

i. said second and third closure caps respectively include a flexible and resilient portion for removable attachment to the body dispensing end.

4,027,782

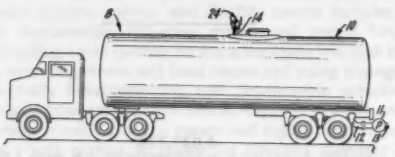
METHOD AND APPARATUS FOR DISCHARGE OF HOT ASPHALT TANKER

Adason Morey Miller, 400 Blackstone, LaGrange, Ill. 60525

Filed Mar. 25, 1976, Ser. No. 670,185

Int. Cl.² B67D *3/00*

U.S. Cl. 222—1 **7 Claims**



1. The method of discharging hot asphalt from a heated tanker of the kind comprising a large sealed manhole opening connected to the tank, a discharge conduit connected to the bottom of the tank, and having a small normally closed vent connected to the top of the tank, comprising:

initiating high-velocity pumping of hot asphalt from the tank, through the discharge conduit;

and subsequently promptly opening the small vent to allow entry of air into the tank, without release of noxious fumes to the atmosphere, to preclude a pressure reduction in the tank sufficient to collapse the tank,

while maintaining the manhole opening sealed throughout the discharge operation.

4,027,783

TALLYING BEVERAGE DISPENSER

William C. Branch; Oliver W. Cole, and Robert P. Kidd, all of Dallas, Tex., assignors to Booth, Inc., Carrollton, Tex.

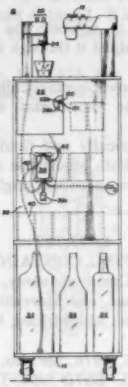
Filed Aug. 28, 1975, Ser. No. 608,454

Int. Cl.² B67D *5/24*

U.S. Cl. 222—26 **12 Claims**

1. In a beverage dispenser in which measured quantity of liquid is drawn from a supply container and dispensed through an output line leading from said measuring means, the combination which comprises:

a. counter means having an input actuator to increment said counter, and



b. means responsive only to liquid pressure connected to said output line for actuating said counter once for each delivery of liquid through said output line.

4,027,784

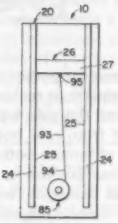
TUBE DISPENSER

Gary Mattson, Box 280, Nashwauk, Minn. 55769

Filed Aug. 24, 1976, Ser. No. 717,026

Int. Cl.² B65D *35/28*

U.S. Cl. 222—102 **9 Claims**



1. A device for holding a collapsible tube and dispensing the contents thereof, comprising:

a. a frame adapted for vertical mounting and including a vertical trackway,

b. a carriage supported on said trackway for movement along a tube adapted to be positioned with in said frame,

c. compressor means operatively associated with said carriage including:

1. a first press roll freely rotably supported on said carriage for engaging one side of the tube, and

2. a second press roll freely roatably supported on said carriage for engaging the other side of the tube and mounted in fixed spaced apart relation to said first press roll so as to expel the contents of the tube as said carriage is moved downwardly relative to the tube,

d. valve means removably carried by said frame at the lower end of said trackway, said valve means including:

1. a valve member having a valve discharge port with a seat communicating with said valve discharge port and adapted for receiving the discharge end of the tube to locate the same in alignment with said trackway, and

2. a valve stem adapted to be moved between an open position in communicating relation with said discharge port to a closed position in non-communicating relation with said discharge port,

e. tension means for applying a downwardly directed force to said carriage which is operable to effect step-by-step movement thereof in tube-collapsing advance along the tube for expeling the contents thereof, said tension means being activated when said valve stem is moved into said open position to permit the contents of the tube to flow outwardly therefrom and deactivated when said valve stem is in its closed position, and

f. said tension means includes:

1. at least one spool rotatably mounted relative to said valve member,

2. a coiled tension spring mounted relative to said spool to apply a continuous torque thereto, and

3. means connecting said spool to said carriage to provide continuously thereto a downwardly directed force of said first and second press roll, such that the downward movement of said carriage automatically occurs when said valve stem is in said open position.

4,027,785

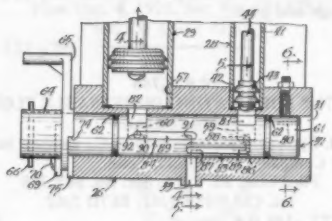
DUAL PUMP COLORANT DISPENSER

Keith G. Edstrom, Park Ridge, and Gene K. Edstrom, Arlington Heights, both of Ill., assignors to Chicago Commutator, Inc., Wheeling, Ill.

Filed Apr. 12, 1976, Ser. No. 675,759

Int. Cl. B67d *5/56*

U.S. Cl. 222—135 **10 Claims**



1. In a colorant dispenser of the type which has a colorant canister supported on a platform, a shelf at a side of the platform on which a paint container may rest to receive colorant from said canister, first and second vertically oriented measuring piston pumps positioned side by side in operative association with the canister for dispensing precise quantities of colorant from the canister, said first pump having a predetermined maximum capacity and said second pump having a maximum capacity which is an even multiple of the maximum capacity of said first pump, and a single valve to control the discharge of colorant from both said pumps to a container, the improvement comprising:

a base for the canister and pumps which has a horizontal bore beneath the pumps;

a first intake passage in the base connecting the canister to said bore in the vertical plane of the first pump;

a second intake passage in the base connecting the canister to said bore in the vertical plane of the second pump;

a single exit port from the bore to the exterior of the base, said exit port being in a transverse vertical plane between the pumps;

and a barrel valve member mounted in the bore for rotation between an intake position, a first dispensing position and a second dispensing position;

said valve member having a first inlet which communicates with the first passage and with the first pump when the valve member is in intake position;

said valve member having a second inlet which communicates with the second passage and with the second pump when the valve member is in intake position;

a first discharge passage in the valve member which extends from the first inlet to a first part of the valve surface which is in the same transverse vertical plane as the exit port and which is circumferentially spaced from said exit port when the valve is in intake position;

a second discharge passage in the valve member which extends from the second inlet to a second part of the valve surface which is in the same transverse vertical plane as the exit port and which is circumferentially spaced from said exit port when the valve is in intake position, said first and second parts of the valve surface being circumferentially spaced from one another;

means for rotating said valve member from said intake position in which neither discharge passage communicates with the exit port selectively to said first dispensing position in which the first discharge passage communicates with the exit port or to said second dispensing position in which said second discharge passage communicates with said exit port, each inlet being closed to the canister when its discharge passage communicates with the exit port;

positive stop means for stopping rotation of the valve member at its intake position and at its second dispensing position;

and detent means for arresting rotation of the valve member at its first dispensing position;

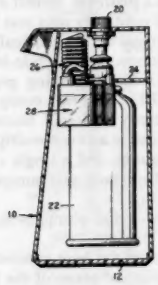
whereby either metering pump may be selectively operated to charge it with a desired amount of colorant when the valve member is in intake position, and the valve member may then be rotated selectively to the dispensing position which places the charged pump in communication with the exit port so the charge of colorant may be dispensed through said port.

4,027,786

APPARATUS FOR HEATING DISPENSABLE FLOWABLE MATERIAL

William D. Ryckman, Jr., Asheboro, N.C., assignor to General Electric Company, Bridgeport, Conn.

Filed Mar. 22, 1976, Ser. No. 669,305
Int. Cl.² H05B *1/02;* **B67D** *5/62*
U.S. Cl. 222—146 HA **5 Claims**



1. Apparatus for heating flowable material from a pressurized container in a housing with a heat exchanger assembly having an inlet and outlet and passage means conducting the material therebetween, and electric heating means in heat transfer relation with said passage means, the improvement in control means for said heating means comprising,

a substantially flat non-conducting chassis,

electric conductors through said chassis and sealed thereto,

an adjustable thermostat supported on one side of said chassis and connected to said conductors,

an extending heat conducting closed tube in fluid tight seal with said chassis on the other side thereof and having said heating means therein,

said passage means disposed around said tube for said heat transfer relation,

a biased axially and rotatably movable control rod extending through said chassis and sealed thereto,

cam means rotatable by said rod connecting to said thermostat,

said rod disposed to activate the thermostat on axial movement and adjust it through said cam on rotation, and

a non-conducting cover hermetically sealed to said chassis enclosing the thermostat and all connections thereto,

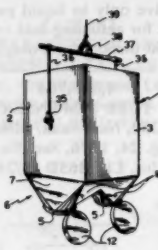
whereby said electrically and fluidically sealed control means provides both adjustable material temperature selection and turn-on with a single control rod.

4,027,787

SHIPPING CONTAINER

Marcel Bibeau, 4611 Castel d'Autray, St. Felix de Valois, Joliette County, Quebec, and Marcellin Barrette, 1013 Berard Avenue, Val d'Or, Abitibi East, Quebec, both of Canada

Filed Feb. 5, 1976, Ser. No. 655,380
Int. Cl.² B67D *5/64, 3/00*
U.S. Cl. 222—166 **2 Claims**



1. A shipping container for particulate material, comprising a container portion of square or rectangular cross-section with a closed flat bottom and flat side walls having a straight top edge uniformly distant from said bottom, and a dual funnel portion forming a pair of funnels both tapering upwardly from the top of said container portion in lateral relationship and forming a pair of equal diameter circular mouths truncating the smaller end of the funnels respectively and located at the same level and along a line parallel to and equally distant from a first pair of parallel side walls, both funnels including a pair of equally inclined flat walls each common to both funnels and joining with the top edges of the first pair of side walls respectively, both funnels further including an inclined outer flat wall joining with the top edge of the side wall of the second pair of side walls, and an inclined inner flat wall joining with the inclined inner flat wall of the other funnel along a straight line parallel to, above and equally distant from the top edges of the side walls of said second pair, said outer flat walls forming a steeper funneling angle than that of said inner flat walls, a circular cover for closing each mouth pivoted to the latter about a pivotal axis parallel to said first pair of side walls for pivotal movement between a mouth closing position engaging said mouth and a mouth opening position lying against said funnel, latch means carried by said funnels engageable with said covers to removably latch the latter in closed position, a tube extending through said container portion, secured to, opening and terminating at said other pair of side walls, said tube parallel to said bottom and to said first pair of said side walls, said tube serving to receive a supporting rod about which said container can be supported and pivoted, said container being free of any projections, such as said covers, whether open or closed, said latch means and said tube, which would protrude from said side walls, so that several shipping

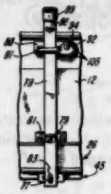
containers can be positioned side by side with their side walls in contact.

4,027,788

SPREADER FOR FERTILIZER, SEED AND THE LIKE

Richard W. Parker, and Arthur L. Kaeser, both of Springfield, Ohio, assignors to Parker Sweeper Company, Springfield, Ohio

Filed Mar. 15, 1976, Ser. No. 666,667
Int. Cl.² A01C *15/00*
U.S. Cl. 222—614 21 Claims



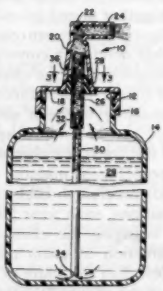
1. An improved spreader for distributing a flowable material on the ground, comprising a hopper having opposite end walls connected by opposite side walls and adapted to receive the material, means supporting said hopper for ground traversing movement, means extending from said hopper to facilitate moving said hopper over the ground, said side and end walls of said hopper having lower edge portions defining a generally rectangular opening, an elongated bottom extrusion forming a bottom wall for said hopper and extending generally between said end walls for closing said opening, means for securing said bottom extrusion to said side walls of said hopper, means defining a first series of longitudinally spaced apertures within said extrusion, said bottom extrusion including an integral lower portion defining a longitudinally extending guideway, an elongated slide member supported for longitudinal movement within said guideway, means defining a second series of longitudinally spaced apertures within said slide member and cooperating with said first series of apertures to provide for a flow of material from said hopper, and means for adjustably positioning said slide member longitudinally within said guideway for controlling the flow of material through said apertures.

4,027,789

FOAMING DEVICE FOR HIGH SOLIDS CONTENT FOAMABLE LIQUIDS

Clarence A. Dickey, Atlanta, Ga., assignor to Glasrock Products, Inc., Atlanta, Ga.

Filed Sept. 10, 1975, Ser. No. 612,039
Int. Cl.² B65D *37/00*
U.S. Cl. 222—190 12 Claims



1. In a foaming device for mixing foamable liquid with a gas overlying the liquid and to dispense the mixture as a foam under pressure of a magnitude on the order of pressures developed by manual collapse of an elastomeric bottle adapted to contain the liquid and gas, the improvement comprising:

means defining an imperforate foam discharge passageway;

a tube having a continuous wall of porous material and depending from said means as an extension of said passageway to a lower end elevated above the level of foamable liquid to be dispensed;

an imperforate dip tube depending from said porous tube as a further extension of said passageway to a lower end to be submerged in the foamable liquid; and

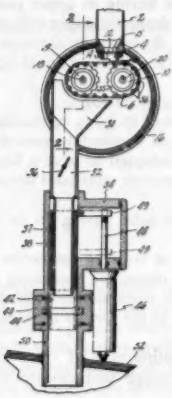
an elongated static mixer in said passageway at or above the level of said porous tube said static mixer being operable to impede direct upward flow of liquid through said passageway and to insure foam generation by mixing of liquid with gas passing into said passageway through the wall of said porous tube along the length thereof and without passage of liquid outwardly through the porous tube wall.

4,027,790

APPARATUS FOR DELIVERING PARTICULATE MATERIAL AT A SELECTED RATE

Jerry A. King, Palm Beach Gardens, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 4, 1975, Ser. No. 637,625
Int. Cl.² G01F *11/10*
U.S. Cl. 222—285 3 Claims



1. Apparatus for delivering particulate material at a selected rate including:

a vertically positioned delivery spout for the particulate material having a removable bottom end opening,

a conveyor belt positioned in closely spaced relation below said end opening and having a delivery end, the conveyor belt having a large number of closely spaced plates forming the operative surface of the belt, with the spacing of the belt from the opening establishing a quantity control,

means positioned directly between the spout and the bottom end opening for adjusting the position of said opening relative to the belt,

a scoop below the delivery end to receive the particulate material from the belt, and

means for driving the belt at such a speed as to deliver particulate material at the selected rate from the spout to the scoop.

4,027,791

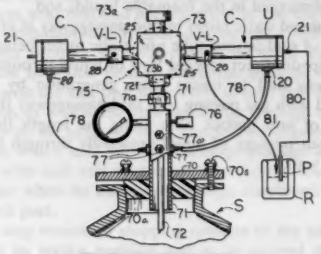
GAS-ENERGIZED LIQUID TRANSFER AND CONTROL SYSTEM

W. Edward Samuels, 402 W. Blackbeard Road, Wilmington, N.C. 28401

Division of Ser. No. 482,338, June 24, 1974, Pat. No. 3,938,554. This application Feb. 12, 1976, Ser. No. 657,446

Int. Cl.² B65D *83/14*

U.S. Cl. 222—396 **5 Claims**



1. A manifold device for cluster mounting, at the mouth of a Dewar flask or like storage vessel for cryogenic liquid, a plurality of N gas-energized fluidic control controller units each including a liquid valving section having a liquid inlet end formation and a liquid outlet and a gas-energized control section having a gas inlet connection, and comprising:

closure means for the vessel mouth;

a gas manifold tube having one end extending through said closure means for communication with gas space having the normal liquid fill of the vessel, and the other end projecting upwardly beyond the closure means;

a liquid riser tube having its upper end sealed gas-tight to and projecting from the upper end of the manifold tube, and extending downwardly through the manifold tube and adapted to reach into a liquid-occupied space of the vessel;

a liquid shutoff valve having

an inlet portion of its body connected to said riser tube,

an N-plurality of connection means on the valve body respectively adapted to have a liquid inlet end formation of a respective controller unit secured supportedly thereto;

said gas manifold tube having on its upwardly extending portion

a plurality of at least N gas outlet connection fittings whereby the respective energizing gas connections of a plurality of N units mounted on said shutoff valve are connectable to the Dewar flask gas region;

and

a pressure regulating pop-off valve communicating by a passageway through said closure means with said gas space.

4,027,792

LOOP FORMING CHAIN

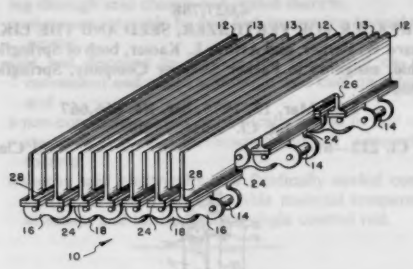
Sheldon M. Jeter, LaGrange, Ga., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Apr. 5, 1973, Ser. No. 348,329

Int. Cl.² B65G *15/00*

U.S. Cl. 198—618 **1 Claim**

1. An improved chain construction for a conveyor system comprising: at least two chains spaced from one another, each of said chains having alternately connected inside chain lugs and outside chain lugs, each of said chain lugs of each chain having attaching elements connected thereto, a first elongated element mounted on the attaching element of the outside lug of the first chain, a second elongated element mounted adjacent and substantially parallel to the first elongated element on the attaching element of the outside lug of the second chain, a third elongated element mounted adjacent and substantially parallel to said second elongated element on the inside lug of said first chain and means maintaining said chains and elongated elements in a fixed relationship to one another,



each of the elongated elements mounted on one chain having a cut out portion adjacent the attaching element of the other chain to prevent interference.

4,027,793

SCRAPER CHAIN CONVEYOR

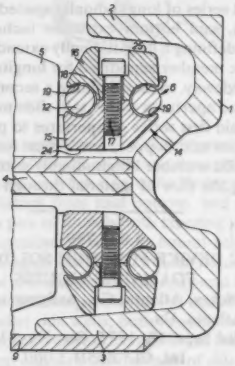
Friedrich Lampl, Cheltenham, and Thomas Campbell Paul, Worcester, both of England, assignors to Dowty Meco Limited, Worcester, England

Filed May 7, 1974, Ser. No. 467,811

Claims priority, application United Kingdom, May 7, 1973, 21536/73

Int. Cl.² B65G *19/00*

U.S. Cl. 198—719 **1 Claim**



1. A scraper chain conveyor comprising a plurality of conveyor pans secured together in end-to-end relation to provide slight relative misalignment between each adjacent pair of pans, the pans together defining a conveyor channel, at least one chain movable lengthwise of the channel, the chain comprising a plurality of similar interconnected oval links giving universal flexing capability between each adjacent pair of links, a plurality of scrapers mounted at spaced intervals along the chain to engage the conveyor channel over a substantial part of its width to propel loose material along the channel, a plurality of wear pads secured to each chain at links spaced from the scraper positions, each wear pad having a flat wear surface capable of engaging the channel whose dimension transverse to the direction of chain movement is within a range from slightly less than the width of the wire of the links to slightly greater than the width of the link, and whose dimension in the direction of chain movement is substantially greater than the space between the curved ends of two links which connect with the link carrying the wear pad, a pair of

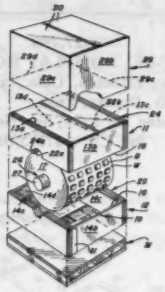
recesses being provided in the pad to accommodate the said curved ends, the wear surfaces of said pads between adjacent pairs of scrapers being spaced above said channel when the associated said pair of scrapers is supported on said channel.

4,027,794

SHIPPING CONTAINER

Gregory J. Olson, Burlington, Wis., assignor to Packaging Corporation of America, Evanston, Ill.

Filed Feb. 17, 1976, Ser. No. 658,707
Int. Cl.² B65D *85/672, 5/36*
U.S. Cl. 206—395 **6 Claims**



1. A container for accommodating a cylindrical unit provided with axially disposed protrusions at opposite ends thereof, said container comprising a pair of foldable complemental housing sections adapted to assume either a collapsed or setup state, said housing sections having one of said sections disposed in an inverted superposed relation with the other section whereby said sections coact to form a unit-accommodating compartment; each housing section including foldably connected wall panels having corresponding first edges delimiting an open end, the wall panel first edges of said housing sections being in substantially abutting relation when said sections form said unit-accommodating compartment, each housing section having a first pair of wall panels in opposed relation and having interior surfaces positioned adjacent the opposite ends of the unit when the latter is disposed within the unit-accommodating compartment; said first pair of wall panels of each housing section being adapted to be in substantially parallel close proximity to each other when said section is in a collapsed state; and substantially inflexible reinforcing pads affixed to exterior surfaces of said first pair of wall panels of each housing section, said pads and the first edges of the wall panels connected thereto having means on peripheral portions thereof adapted to supportingly engage the unit protrusions when the unit is accommodated within said compartment.

4,027,795

DISPENSER PACK FOR CONTINUOUS STATIONERY

Peter Charles Edwin Rigden, Horsham, England, assignor to Spicers Limited, Sussex, England

Filed Jan. 12, 1976, Ser. No. 648,205
Claims priority, application United Kingdom, Jan. 13, 1975, 1281/75
Int. Cl.² B65D *85/67*
U.S. Cl. 206—409 **12 Claims**

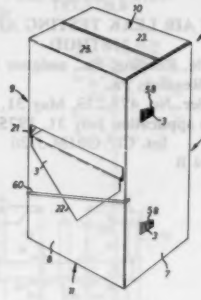
1. A dispenser pack for continuous dispensing of stationery in web form from a roll thereof comprising:

a closed rectangular container having a top, a bottom, a front wall, a rear wall and a pair of side walls,

a rectangular carrier having a rear wall, a pair of side walls and top and bottom walls, said carrier being open at its front, said carrier being disposed in the container

said side walls of the carrier including means for rotatably supporting at least one roll of said stationery between the side walls of the carrier,

the front wall of the container having a transversely extend-



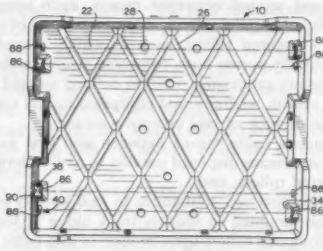
ing slot formed therein to permit the web of stationery to pass therethrough from the interior of the container, said transversely extending slot being located on the front wall between the top and bottom of the front wall.

4,027,796

STACKABLE AND NESTABLE CONTAINER

Sam M. Martin, Toronto, Canada, assignor to Consumers Glass Company Limited, Etobicoke, Canada

Filed Dec. 1, 1975, Ser. No. 636,634
Int. Cl.² B65D *21/04*
U.S. Cl. 206—507 **11 Claims**



1. An open-top container adapted to be stacked and nested vertically with a container of substantially identical shape comprising two pairs of opposed interconnected upright walls, each pair of upright walls sloping inwardly toward each other from top to bottom thereof and an interconnected bottom wall, a pair of said upright walls having ventilation means for providing ventilation for the container interior, the bottom wall having drainage means for draining liquid from the container interior, a pair of upright walls each having inwardly projecting flutes extending upwardly from the bottom of the wall and terminating near the top thereof, the upper portion of each flute being closed to present a support surface, stacking guidance means and engagement means being provided on said container, said guidance means being located above said support surfaces and on an inner surface of each wall having said flutes, said engagement means being adapted for engaging stacked containers in a manner to restrict movement between stacked containers in a substantially horizontal plane, and means being provided on said container for precluding an upper container binding in a lower container when like containers are nested one within the other, the arrangement being such that said guidance means is adapted to guide the stacking of an upper container down onto a lower container by the interaction between said guidance means of a lower container and a lower portion of the outer surface of a corresponding

upper container upright walls whereby said engagement means of the upper and lower containers are in register.

4,027,797

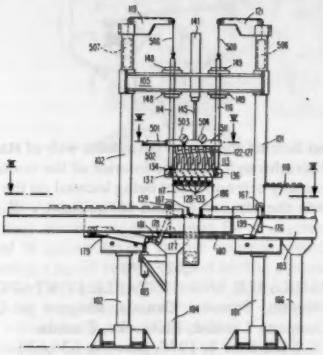
AUTOMATIC AIR LEAK TESTING APPARATUS AND METHOD

William J. Eberle, Reading, Pa., assignor to General Battery Corporation, Reading, Pa.

Division of Ser. No. 475,273, May 31, 1974, Pat. No. 3,938,368. This application July 31, 1975, Ser. No. 600,840

Int. Cl.² G01M 3/26

U.S. Cl. 209—74 R 4 Claims



1. In an automotive battery production system, apparatus for selectively isolating automotive batteries comprising:

a. first and second conveyor means, each comprising a plurality of parallel rollers, at least a portion of the rollers being elongated rollers each of which extend at least substantially across both conveyor means in the vicinity of a battery processing position defined on said first conveyor means, whereby said elongated rollers constitute a portion of each of said conveyor means;

b. continuous cable means between said first and second conveyor means disposed parallel to and underneath said elongated rollers; and

c. a pusher disposed contiguous to said battery processing position mounted to slidably track along at least two of said elongated rollers upon motion of said cable means to slide a battery substantially axially along said elongated rollers to said second conveyor means, said rollers coacting with said pusher to substantially prevent movement of said pusher in a direction transverse with respect to the axis of said rollers.

4,027,798

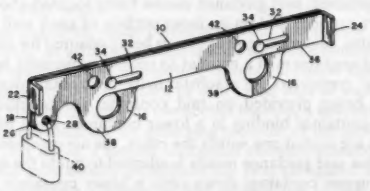
LOCKABLE RACK FOR FISHING RODS AND THE LIKE

Gayland Clarence Swaim, 4922 Mount Bigelow Drive, San Diego, Calif. 92111

Filed July 14, 1976, Ser. No. 705,054

Int. Cl.² A47F 5/00

U.S. Cl. 211—4 5 Claims



1. A lockable rack for fishing rods and the like, comprising:

an elongated mounting plate having at least one open hook extending from one longitudinal edge thereof;

an elongated slide bar longitudinally slidably mounted on said mounting plate to move between an open position and a closed position;

said slide bar having at least one hook portion extending from one longitudinal edge to overlap and close the open hook on said mounting plate in the closed position;

said mounting plate having screw receiving holes therein for attachment to a supporting surface;

said slide bar having access openings therein to expose said screw receiving holes in the open position;

and locking means on said mounting plate and slide bar for receiving a lock in the closed position.

4,027,799

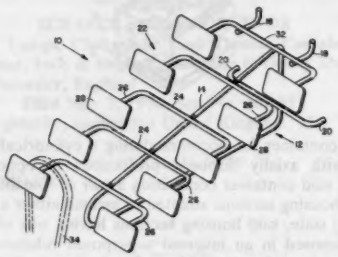
V-BELT DISPLAY HOOK

Donald D. Stucker, Littleton, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed June 18, 1975, Ser. No. 587,926

Int. Cl.² A47F 5/08

U.S. Cl. 211—13 1 Claim



1. A display support for V-belts comprising:

a frame member having a sloping mounting portion;

means for attaching the frame member to a secondary frame member;

a plurality of generally U-shaped hooks with bottom portions spaced and secured transversely of the mounting portion, so arranged that the leg portions of the hook project forwardly of and are laterally spaced from the mounting portion, and are oriented in the same direction and spaced generally end-to-end in generally spaced planes whereby the legs are stepped in relation to each other; and

means for mounting belt indicia to the leg portions of each hook, said means comprising a plurality of generally flat plates, one plate attached to the forwardly projecting end of each leg portion.

4,027,800

GANTRY CRANE WITH PLURAL HOIST MEANS

Karl L. Polen, Alliance, Ohio, assignor to The Alliance Machine Company, Alliance, Ohio

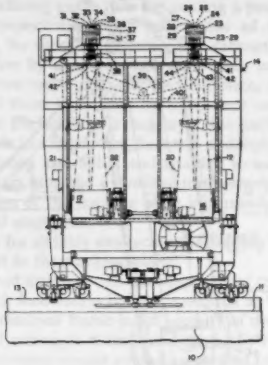
Filed Dec. 3, 1975, Ser. No. 637,230

Int. Cl.² B66C 5/02

U.S. Cl. 212—14 5 Claims

1. In a gantry crane adapted to run on spaced parallel rails having two spaced apart end frames connected by an overhead frame, the improvement comprising a pair of drums in each end frame, means for driving each pair of drums in one end frame in unison, a pair of cables on each drum extending upward over sheaves at the top of the end frame, one of said cables from each drum passing across the overhead frames to the opposite end frame and around a sheave at the top thereof and through a multiplying lift sheave assembly of upper and lower relatively movable sheaves and dead end at one of said upper and lower sheaves, the other of said pairs of cables from

each drum passing over multiplying upper and lower relatively movable lift sheaves at the end frame carrying the drum and dead ending at one of said upper and lower relatively movable



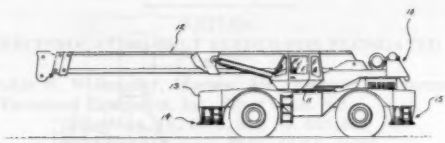
lift sheaves whereby each set of relatively movable lift sheaves has a double cable reeving, one from the drum at the end adjacent it and one from the drum directly opposite it on the other end frame.

4,027,801

OUTRIGGER SYSTEM FOR VEHICLES

Roger L. Johnston, Muskego, and Daniel C. Wiencek, Milwaukee, both of Wis., assignors to Bucyrus-Erie Company, South Milwaukee, Wis.

Filed May 21, 1976, Ser. No. 688,925
Int. Cl.² B66C *23/62*
U.S. Cl. 212—145 **8 Claims**



1. An outrigger system for increased stability which comprises:

a support member,

an extendible housing movably supported on said support member,

a beam telescopically positioned within said housing and adapted for sidewards movement out of said housing,

stop means on said beam and on the housing to prevent said beam from being moved completely out of said housing,

a float jack on the free end of said beam, and

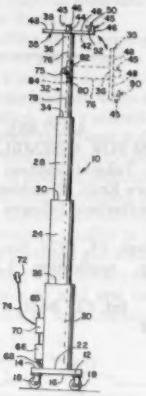
a fluid-actuated cylinder having an extensible piston rod, and a base, the base of said cylinder being anchored to the support member which extends through a slot in housing and the free end of the piston rod being attached to the beam so that as the piston rod is extended the beam is moved sidewardly out of said housing, until said beam is substantially fully extended at which time the stop means on the housing and beam coact to prevent further sidewards extension of the beam at which time further extension of the piston rod moves the housing sidewardly thus providing greater reach and stability than with the beam alone.

4,027,802

BUILDING PANEL POSITIONER

Francis E. Reynolds, 166 E. 4th St., Chillicothe, Ohio 45601

Filed Aug. 3, 1976, Ser. No. 711,134
Int. Cl.² B23Q *5/26*
U.S. Cl. 214—1 SW **2 Claims**



1. A building panel positioner for use in applying ceiling or wall board or panel to a framework in building construction comprising:

a. a base having wheels to facilitate positionment thereof;

b. an elongated hollow upright bottom section secured at one end thereof to said base;

c. an elongated tubular intermediate section mounted for telescopic movement inside said base section;

d. an elongated inner top section mounted for telescopic movement inside said intermediate section;

e. support means secured to said top section for containing thereon the board or panel during positionment relative to the framework, said support means including four substantially equally spaced support arms extending outwardly from said top section to define a planar support surface;

f. retaining means for preventing lateral movement of the board or panel relative to said support means in a given direction, said retaining means including a vertically extending finger associated with at least two of said adjacent support arms at substantially one end thereof positioned above the support plane, such that lateral movement of the board or panel on the support plane in the direction of said retaining means is prevented;

g. means for vertically adjusting said sections relative to each other for raising or lowering a wall board or panel positioned on said support means in place for securment to the framework;

h. said vertically adjusting means includes a compressor, an electric motor for powering said compressor, and a switch electrically connected to said electric motor, such that when said motor is energized the compressor is actuated to raise and lower said sections;

i. locking means in operative relation with said retaining means on two of said adjacent support arms to be adjusted to a position in spaced relation to said support arm and in partially overlapping relation to the board or panel, such that outward movement of the board or panel from the support plane is prevented; and

j. said locking means includes:

i. a locking member pivotally secured at one end to the upper end of said finger,

ii. means for securing said locking member in releasably fixed position and in overlapping relation to the board or panel,

iii. mating surfaces on said locking member and said finger for engagement with each other, and

iv. said securing means includes a fastener extending between said locking member and said finger which when tightened will retain said mating surfaces in fixed position.

4,027,803

MECHANISM FOR ASSEMBLING SHIP'S HULL

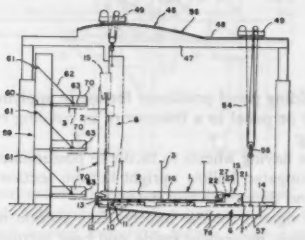
Kaoru Kawasaki; Takeshi Sakano; Shigeru Furuya, all of Kure, and Shigeru Endo, Hiroshima, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Ote, Japan

Filed Sept. 15, 1975, Ser. No. 613,414

Claims priority, application Japan, Sept. 27, 1974, 49-111036

Int. Cl.² B65G *49/00*

U.S. Cl. 214—1 H **2 Claims**



1. Mechanism for assemblying ship's hull blocks having longitudinal and transverse structural members to be welded together, said mechanism comprising a hull block supporting and erecting bed for supporting a hull block in a horizontal position, a stationary part, means forming a pivotal connection between one side edge of the bed and said stationary part, and means including a travelling crane for rotating said bed and hull block about said pivotal connection to move the bed and block to an upright position for welding operations between said structural members and to return the bed and block to a horizontal position, said crane having a substantially horizontal track terminating in an upwardly convex curved section positioned above said pivotal connection.

4,027,804

LAMP COMPONENT TRANSPORT DEVICE

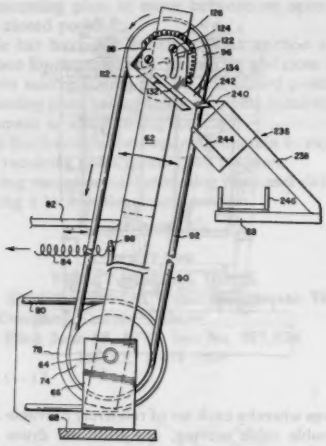
Donald J. Belknap, P.O. Box 325, Mountain Home, N.C. 28758

Division of Ser. No. 372,535, June 22, 1973, Pat. No. 3,914,640, which is a division of Ser. No. 147,747, May 28, 1971, Pat. No. 3,762,900. This application Aug. 8, 1975, Ser. No. 603,160

Int. Cl.² B65G *47/92*

U.S. Cl. 214—1 BV **6 Claims**

1. A component transport comprising a platform for holding a component, means for moving said platform from one station to another, and means for unloading said component from said platform, the last-mentioned means including pivotal means supported on said platform for pivotal movement relative thereto and for engaging the component on said platform and moving it therefrom, said platform having a magnet for holding a component thereon magnetically, said component unloading means including means located along the path



of movement of said platform for engaging said pivotal means and causing it to pivot relative to said platform.

4,027,805

AUTOMATIC LOADING APPARATUS FOR LOADING DISCRETE CARGO, PARTICULARLY SACKS, ONTO STATIONARY OR MOBILE LOADING PLATFORMS

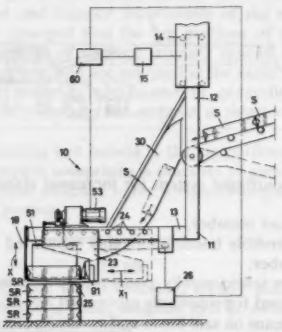
Bernhard Beumer, Beckum, and Wolfram Jendrzey, Ostenfelde, both of Germany, assignors to B. Beumer Maschinenfabrik KG, Beckum, Germany

Filed Oct. 24, 1975, Ser. No. 625,671

Claims priority, application Germany, Apr. 17, 1975, 2516957

Int. Cl.² B65G *57/06*

U.S. Cl. 214—6 G **8 Claims**



1. An automatic loading apparatus for loading discrete cargo, particularly sacks, onto a stacking plane on stationary or mobile loading platforms, comprising a machine frame, a feed track for feeding discrete goods mounted in the machine frame, a packing plate and pusher means movable in opposite directions within a plane above the packing plate, the packing plate and the pusher means being movable upwardly and downwardly in a substantially vertical direction through a distance corresponding substantially to the height of a layer of sacks, said apparatus being characterized by the combination of the following characteristics:

a. a loading head consisting of a mounting frame including a vertical support rod and a horizontally cantilevered

substantially rectangular frame secured to the support rod, a vertical stop plate extending across the whole width of the packing plate mounted at one face of the rectangular frame and having a pair of longitudinal frame members defining guide rails for guiding a pair of slides movable respectively along either side of the rectangular frame, the slides being driven in a substantially horizontal direction by an associated drive unit, and mounting at their free lower ends the packing plate, the latter being spaced from the frame by a distance corresponding at least to the height of a sack layer, the packing plate being movable in a horizontal direction and transversely of sack rows being assembled and adapted to cooperate with a stationary stop bar extending transversely of the pull-off direction of the packing plate in a position opposite the vertical stop plate;

b. means for slidably displacing the loading head in a plane parallel to the stacking plane;

c. sack feed means on the upstream side of the loading head, the sack feed means being disposed at an elevating frame in the machine frame in the vicinity of the discharge end of feed conveyor means, and cyclically operated timing feed conveyor means extending parallel to the feed direction of discrete goods and adapted to be moved in increments corresponding substantially to the length or width dimension of the discrete goods;

d. means for moving the packing plate in the sack feeding direction, a first sensing plate mounted on the bottom of the packing plate, and spring plates each mounted on an opposite end of said packing plate and serving as actuating means for associated electrical switches;

e. transfer means provided above the packing plate adjacent an end of transverse pusher means that faces the sack feeding means;

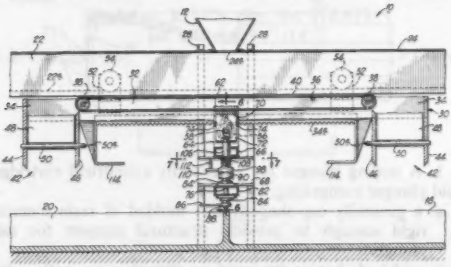
f. sack pivoting means operatively associated with the sack feeding means;

g. the loading head including a second sensing plate located adjacent one side of said packing plate and connected to control members, and these control members being coupled, together with respective control members associated with the first sensing plate, to controller means for controlling feed and elevational movements of the elevating frame.

4,027,806
RECIPROCATING BELT FEEDER FOR ELONGATED BINS

Walter N. Weihmuller, Warsaw, Ind., assignor to Supreme Farmstead Equipment, Inc., Silver Lake, Ind.

Filed Aug. 18, 1975, Ser. No. 605,268
Int. Cl.² A01K *5/02;* **B65G** *21/12, 41/02*
U.S. Cl. 214—16 R **8 Claims**



1. A feeder for distributing material from a common supply point into a selected one of a plurality of elongated bins, said bins arranged in parallel rows in side by side relation and in end to end relation in said rows, said feeder comprising:

an elongated conveyor having a frame and a reversibly movable belt supported from said frame,

drive means positioned adjacent said common supply point engaging said frame for reciprocally moving said conveyor longitudinally on opposite sides of said common supply point between longitudinal opposite ends of said bins,

clamping means for sequentially holding and releasing a run of said conveyor belt with respect to the direction of movement of said conveyor,

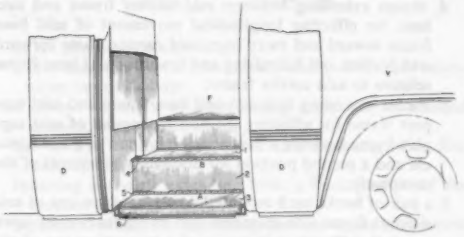
means for discharging material from said belt into a selected bin in a selected row thereof, and

cam means for controlling said clamping means and selectively movable between a first position operative to clamp said belt when said frame is driven in one direction along said bins and to release said belt when said frame is driven in an opposite direction, and a second position operative to clamp said belt when said frame is driven in said opposite direction along said bins and to release said belt when said frame is driven in said one direction, said cam means comprising a pair of cam members having confronting cam surfaces and a selector for moving a cam surface of one of said cam members relative to the other between said first and second positions and actuator means on said conveyor for moving a cam surface of the other of said cam members relative to said one cam member in response to the position of said conveyor relative to said bins.

4,027,807
WHEELCHAIR LIFT

Graham R. Thorley, San Diego, Calif., assignor to Transportation Design & Technology, San Diego, Calif.

Filed Aug. 20, 1975, Ser. No. 606,137
Int. Cl.² B60R *3/02;* **B61D** *23/02;* **B62D** *25/22*
U.S. Cl. 214—75 R **3 Claims**



1. The combination with a stairway structure of a plurality of movable steps cooperating to form a lift platform which comprises:

a collapsible step;

an extensible step;

a joint raiser section hingedly connected to said collapsible step and extensible step;

a pair of vertical guides disposed respectively at opposite ends of the collapsible step;

means for vertically moving the collapsible step along and between the vertical guides;

a pair of horizontal guides disposed respectively at opposite ends of the extensible step;

means for horizontally and outwardly moving the extensible step along and between the horizontal guides;

a pair of vertical lifting guides disposed respectively at opposite sides of the stairway structure; and

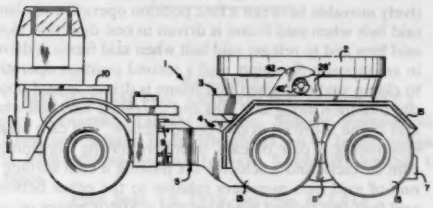
means for moving the collapsible step, and the extensible step, together along the lifting guides between the lower and upper levels of the stairway structure.

4,027,808

RECEPTACLE TRANSPORTING VEHICLE

Thomas Lee Richard Hardwick, 1212 S. Parker Road, Olathe, Kans. 66061

Filed Mar. 29, 1976, Ser. No. 671,623
Int. Cl.² B65G *65/04*
U.S. Cl. 214—313 **3 Claims**



1. A transporting vehicle for receptacles having opposed handles including trunnions and bracket portions with depening lobes thereon comprising:

a. an elongated mobile carrier frame having a forward end portion and a pair of side members extending rearwardly from said forward end portion and spaced transversely outwardly from a longitudinal central axis of said carrier frame;

b. an elongated base frame mounted on said carrier frame;

c. an elongated support frame mounted on said base frame for pivoted movement relative thereto, said support frame having a forward portion and spaced transversely outwardly from a longitudinal central axis of said support frame, said support frame side members each having an upper surface and a recessed shelf portion thereon for supporting a bracket portion of the respective handles of a receptacle on said support frame, said shelf portions each terminating at a respective upstanding shoulder adjacent said support frame forward portion for engagement by a bracket of a respective one of the receptacle handles;

d. means extending between said carrier frame and said base for effecting longitudinal movement of said base frame toward and away from said carrier frame forward end portion and for raising and lowering said base frame relative to said carrier frame;

e. means extending between said base frame and said support frame for effecting pivoted movement of said support frame between a first position for carrying a receptacle and a second position for discharging contents of the receptacle;

f. a pair of hooks each mounted on a respective one of said support frame side members and being rearwardly open to receive therein a trunnion of a respective one of the receptacle handle portions, said hooks being spaced from said shoulders and cooperating therewith to position the receptacle relative to said frame;

g. power means on said support frame for locking the receptacle handles thereto and including latch members operative for selectively engaging a depending lobe of each of the receptacle handles for retaining same in engagement with said respective shoulder during travel of said carrier frame and during pivotal movement of said support frame relative to said base frame.

4,027,809

CHAFF COLLECTOR

Jerome J. Gerber, Murdock, Kans. 67111

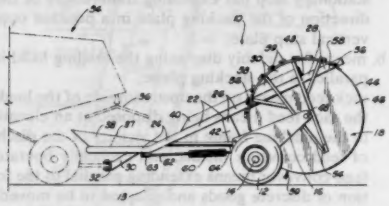
Filed Dec. 8, 1975, Ser. No. 638,450
Int. Cl.² B60P *1/00*
U.S. Cl. 214—353 **4 Claims**

1. A chaff collector towed behind a vehicle and receiving chaff therefrom, the collector automatically unloading the chaff on the ground surface when the collector is full, the collector comprising:

a pair of wheels mounted on a wheel shaft;

conveyor and drum supports having a front portion, a center portion and a rear portion, the center portion of said supports rotatably mounted on said wheel shaft, said supports disposed adjacent said wheels;

an endless conveyor mounted on a conveyor frame, said frame having a front portion, a center portion and a rear portion, the front portion of said frame attached to the rear of the vehicle, the center portion of said frame attached to the front portion of said supports and supported thereon; and



a drum having a cylindrical surface with an open portion therein; the sides of the open portion resting against the bottom of the rear portion of said frame when said conveyor is loading shaft into said drum;

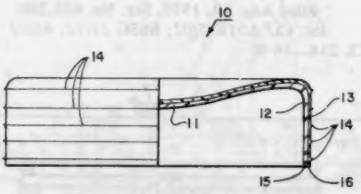
said drum and said frame balanced on opposite ends of said supports so that the weight of said frame and said conveyor rotate said supports in a counterclockwise direction biasing said drum in an upward position above the ground surface when said drum is being located with chaff, when said drum is loaded with chaff the weight of the drum rotates said supports in a clockwise direction and said drum moves downward contacting the ground surface and unloading the chaff while rotating thereon.

4,027,810

SEALING PLUNGER FOR CARTRIDGE

Dick T. vanManen, Canandaigua, N.Y., assignor to Voplex Corporation, Pittsford, N.Y.

Filed Jan. 27, 1976, Ser. No. 652,829
Int. Cl.² B27G *11/02*
U.S. Cl. 222—327 **8 Claims**



1. A sealing plunger for a generally cylindrical cartridge, said plunger comprising:

a. a generally cup-shaped body molded of resin material rigid enough to provide structural support for said plunger;

b. said body having an annular wall with a generally cylindrical outer surface providing a substantial wall area closely and uniformly spaced from the inner surface of said cartridge when said plunger is in said cartridge;

c. seal material adjoined to said body and molded of resin material substantially softer and more resilient than said resin material of said body;

d. said seal material extending in a thin layer around all of said outer surface of said annular wall;

e. said seal material having a resin-to-resin bond with said outer surface of said annular wall; and

f. said annular wall compressing said seal material tightly against said inner surface of said cartridge to conform said seal material to said inner surface when said plunger is in said cartridge.

4,027,811

BLOW MOLDED CONTAINER WITH NESTABLE POURING SPOUT WITH IMPROVED SPOUT OPENING AND WITHDRAWAL MEANS

Walter K. Chlystun, 327 St. James Drive, Spartanburg, S.C. 29304

Filed Dec. 8, 1975, Ser. No. 638,618
Int. Cl.² B67D *3/00*
U.S. Cl. 222—529 **14 Claims**

1. An improved dispensing container comprising:

a. a container body;

b. a top secured to said body;

c. a pouring spout secured to said top, said spout being nestable within said body and withdrawable to an extended, dispensing position;

d. a cover secured to said pouring spout and including spout withdrawal means thereon, said cover being removeable from said spout to permit dispensing of the contents of said container therethrough; and

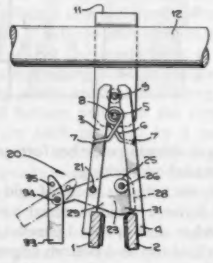
e. vent forming means located on said spout and being secured to an underside of a portion of said cover, said vent forming means comprising a strip of meterial extending from beneath said cover along a portion of the length of said spout, said material having an undercut portion thereaiong to foster rupture upon receipt of sufficient force thereon to produce said vent in said spout and permit ease of withdrawal of said spout from a vested position.

4,027,812

CLOTHING HANGER

Harry G. Roseberg, 3101 S. Barrington, Los Angeles, Calif. 90066

Filed Apr. 2, 1976, Ser. No. 673,091
Int. Cl.² A47J *51/14*
U.S. Cl. 223—96 **8 Claims**



1. In a clothing hanger having a pair of jaws and a pair of arms, each arm being connected to a jaw, said arms being pivotally mounted relative to each other whereby pivoting of the arms clamps and unclamps the jaws, biasing means for biasing the jaws to their clamped position and separating means for opening the jaws against the biasing means, the improvement in separating means comprising the provision of:

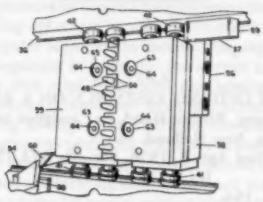
camming means movably mounted on one of said arms for camming engagement with the other of said arms during movement of the camming means between a first arm separating position and a second position allowing said biasing means to clamp the jaws, said camming means being pivotally mounted to said one of said arms for pivoting of the camming means between the first arm separating position and the second position, and stop means on the hanger for preventing movement of the camming means beyond the first arm separating position to retain the camming means in the first position and means for mounting said stop means in a position for setting the first position of the camming means such that small forces on the camming means toward the second position move the camming means a sufficient distance so that the other of said arms cams the camming means to its second position under urging from the biasing means.

4,027,813

TUBE SEPARATOR

Glenn V. Dukes, Cadillac, and Thomas L. Stroh, Lake City, both of Mich., assignors to Cadillac Rubber & Plastics, Inc., Cadillac, Mich.

Filed June 17, 1976, Ser. No. 697,207
Int. Cl.² B26F *3/02*
U.S. Cl. 225—97 **24 Claims**



1. An apparatus comprising:

a first separator element having a plurality of toothed extensions on a side edge;

a second separator element having a plurality of toothed extensions on a side edge;

the second toothed extensions interdigitating with first toothed extensions;

fastening elements extending from a front portion of the toothed extensions; and

separation means for separating the first separator element from the second separator element a sufficient distance to separate a group of joined tubes into two sets of tubes.

4,027,814

APPARATUS FOR BREAKING BRITTLE RODS OR FIBERS

Detlef Christoph Gloge, Red Bank; Peter William Smith, Colts Neck, and Edwin LeRoy Chinnock, Rumson, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 412,293, Nov. 2, 1973, Pat. No. 3,934,773.
This application Oct. 24, 1975, Ser. No. 625,484
Int. Cl.² B26F *3/00*
U.S. Cl. 225—104 **9 Claims**

1. Apparatus for breaking a rod of brittle material by bending and tensioning appropriate for use with scoring, comprising:

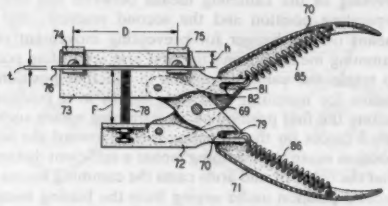
means for placing said rod under tensile stress and bending said rod within an intermediate section between

separate sections of said rod, said means for placing and bending comprising

friction-producing clamps for holding said separate sections of said rod;

a member disposed under said rod to support it and adapted to have a curved surface in contact with said intermediate section of said rod under conditions of bending, and

means for translating said supporting member normal to the axis of said rod,



the supporting member being sufficiently flexible to impart a varying radius of curvature to said rod when said member is translated, the rod and the supporting member acting as one composite member,

whereby said support member is able to define both a radius of curvature and an always positive stress distribution for said rod in said intermediate section.

4,027,815

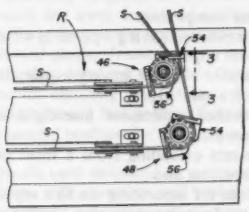
WIRE GUIDING ASSEMBLY ON A BALER

Robert G. Young, Bird-in-Hand, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.

Filed Apr. 5, 1976, Ser. No. 673,773

Int. Cl.² B65H *17/20*

U.S. Cl. 226—194 **14 Claims**



1. An improved assembly on a baler for guiding a tying medium, such as at least one strand of wire or the like, toward a desired position on said baler for facilitating the banding of bales formed by said baler with said strand of said medium, said improved guiding assembly comprising:

at least one roller element including a pair of spaced apart sidewalls and a body connected thereto and mounted for rotation on said baler, said body having at least an outer portion being disposed between said sidewalls, said sidewalls extending outwardly beyond said outer portion of said body to form spaced apart flanges on said outer body portion which together with the same define a strand guiding channel; and

a wrapper element removably receivable over at least one of said flanges to and from within said channel about said outer body portion and between said flanges, said wrapper element, when received within said channel, being engaged by said strand during the guiding of the same toward said desired position on said baler.

4,027,816

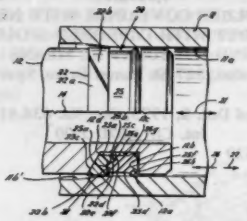
SEAL ASSEMBLY

Damon T. Slator; Thomas R. Bishop, and Archie W. Peil, all of Houston, Tex., assignors to Bowen Tools, Inc.

Filed Apr. 18, 1975, Ser. No. 569,370

Int. Cl.² F16J *15/24*

U.S. Cl. 277—188 R **3 Claims**



1. A seal assembly for tool members wherein one of said tool members has a groove therein for receiving said seal assembly for sealably engaging another tool member, comprising:

a split protective ring for mounting in an annular groove in a first tool member, said split protective ring including tapered end portions that overlap in said groove, said ring having an inwardly positioned circumferential ledge; and

a seal ring for mounting in said annular groove, said seal ring having first and second radially directed surfaces and a circumferential locking shoulder facing inwardly for mounting over said circumferential split protective ring ledge, whereby said split protective ring is held in said groove in said first tool member even during assembly of said tools, and adapted to sealably engage a second tool for relative movement with respect member.

4,027,817

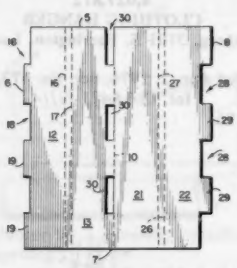
SELF-LOCKING CUSHIONING MEMBER

Edwin A. Fremion, West Alexandria, Ohio, assignor to Westvaco Corporation, New York, N.Y.

Filed Oct. 4, 1976, Ser. No. 728,999

Int. Cl.² B65D *5/50, 25/12, 85/00*

U.S. Cl. 229—14 C **10 Claims**



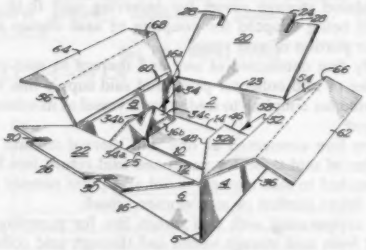
1. A self locking cushioning member formed from a blank of foldable sheet material comprising:

a. a substantially rectangular sheet of said material formed from several layers of said material having parallel top and bottom edges and opposed parallel lateral edes perpendicular to said top and bottom edges;

b. a first score line extending from said top to said bottom edge located substantially centrally of said sheet of material and dividing said sheet laterally into a plurality of leg forming panels;

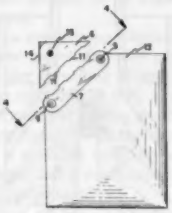
c. a first pair of leg forming panels on each side of said first score;
d. at least one additional pair of leg forming panels foldably connected to the laterial free edges of said first pair of leg panels;
e. a first set of cut outs in said sheet material located along the lateral free edges of each of said additional pair of leg forming panels which provide a plurality of first tongue elements;
f. a second set of cut outs in said sheet material located along the lateral free edges of the other of said additional pair of leg forming panels, said second set of cutouts being equally spaced between the first set of cutouts to provide a plurality of second tongue elements that are diametrically offset from said ffirst tongue elements;
g. a third set of cutouts in said sheet material arranged along one side of said first score line and corresponding in diametrical location to one of the first or second set of cutouts.

4,027,818
SELF LOCKING CONTAINER
Mark Steven Stoll, Minneapolis, Minn., assignor to Liberty Carton Co., Minneapolis, Minn.
Filed Dec. 18, 1975, Ser. No. 642,150
Int. Cl.² B65D *5/22, 5/02*
U.S. Cl. 229—37 R **5 Claims**



1. A container formed from cut and scored, bendable fiberboard comprising:
four upright side walls joined together in a substantially rectangular configuration;
a pair of opposed bottom panels hingedly attached to the bottom, longitudinal edges of one opposed pair of said side walls along fold line connections therewith, said bottom panels being folded upwardly and inwardly towards each other to horizontal positions defining the bottom wall of said container;
a pair of reinforcing panels hingedly attached to the bottom, longitudinal edges of the other pair of opposed side walls along fold line connections therewith, said reinforcing panels being folded upwardly and inwardly inside of said bottom panels to substantially upright positions in overlying relation against the inside faces of the other pair of side walls in supporting relation therewith;
said reinforcing panels are attached along fold line connections to said bottom panels at the corners of said container and are each gusseted by a pair of score lines angling inwardly and downwardly towards each other from the opposite ends of the bottom longitudinal edges of said other pair of side walls, when said reinforcing panels are in a downwardly extended, open position, whereby the upward and inward folding movement of said bottom panels from downwardly extended, open positions to their closed positions forming said bottom wall carries said interconnected reinforcing panels upwardly and inwardly therewith to collapsed positions of triangular-like shape in which said reinforcing panels are held in upright, overlying relation to said other pair of side walls; and
means securing said reinforcing panels in said upright positions against said other pair of side walls.

4,027,819
CLOSURE DEVICE FOR BAGS OR SIMILAR CONTAINERS
Jesus Herrera-Gutierrez, Escobedo Sur 733-201, Monterrey, N.L., Mexico
Filed Mar. 29, 1976, Ser. No. 671,506
Int. Cl.² B65D *33/30*
U.S. Cl. 229—65 **6 Claims**



1. A closure device for affixing to the corner of a flexible bag, comprising in combination, a planar sheet of flexible metal substantially triangular in form having a weakened fold line therein for folding over two interconnected substantially triangular segments and sandwiching between them the corner of a bag, mating apertures located substantially at corners of said two triangular segments to receive clasping structure for holding the segments in place on the corner of a bag, slots defined along that edge of at least one segment which will occupy a position furthermost from the corner of the bag thereby defining an edge band, said slots also being for receiving knife structure to perforate for ready removal the corner of a bag when held between said two segments, narrow metallic joints formed on each segment positioned for breaking off a substantially triangular corner section with repeated bending when affixed to a bag thereby leaving said edge band and at least two of said mating apertures affixed to the bag and thereby for removing a corner section of the bag defined along said slots with the broken off corner section thereby defining a mouth in one corner of the bag, wherein said flexible metal band has a characteristic such that it may be bent to hold open the mouth of the bag for removal of contents and restraightened to hold the mouth closed.

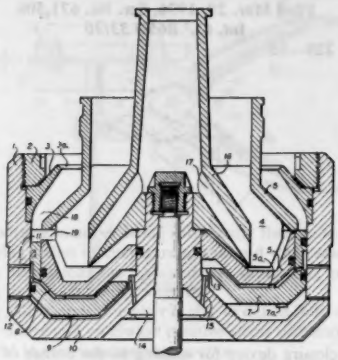
4,027,820
SELF-CLEANING CENTRIFUGAL DRUM FOR THE PERIODICAL REMOVAL OF A PORTION OF THE SOLIDS SEPARATED FROM A LIQUID AND COLLECTING IN THE PERIPHERAL PART OF THE INTERIOR OF THE DRUM
Otto Külker, Rietberg, Germany, assignor to Westfalia Separator AG, Germany
Filed Aug. 24, 1976, Ser. No. 717,300
Claims priority, application Germany, Aug. 30, 1975, 2538630
Int. Cl.² B04B *3/02*
U.S. Cl. 233—20 A **3 Claims**

1. Self cleaning centrifugal drum for separating solids from a liquid constructed for the periodic removal of solids separated from the liquid comprising:
a. a rotating drum housing, a closing piston disposed in the lower part of the housing, and a separating plate disposed in the upper part of the housing, the closing piston and separating plate defining a separating chamber for said separation, and are disposed radially inwardly of the

housing so as to define an annular gap between the housing and the closing piston and separating plate,

b. a pumping piston disposed in lower part of the drum encompassing the closing piston and extending upwardly into the annular gap, means defining a closing piston control chamber between the pistons and means defining a pumping piston control chamber between the pumping piston and the bottom of the housing, and

c. means for supplying and discharging control liquid to the control chambers for supplying control liquid to the clos-



ing piston control chamber for raising the closing piston into sealing relation with the separating plate and lowering the closing piston, in response to weight of the solids in the drum, for discharge of solids from the separating chamber into the annular gap, and for raising the pumping piston only after and while the closing piston is in said sealing relation for pumping of solids discharged into the annular gap, upwardly in the annular gap, and for lowering the pumping piston below the lower level of the separating plate for permitting the discharge of solids into the annular gap.

4,027,821

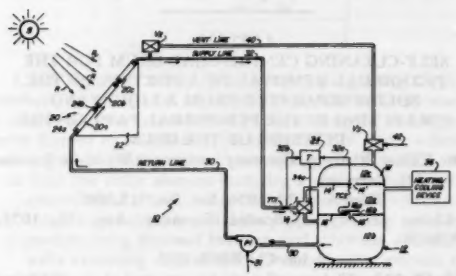
SOLAR HEATING/COOLING SYSTEM

William Roger Hayes, Deerfield, and Satoru Shikasho, Chicago, both of Ill., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed July 18, 1975, Ser. No. 597,282

Int. Cl.[2] F24J *3/02*

U.S. Cl. 237—1 A **14 Claims**



1. A solar energy conversion system of the type wherein a heat transport fluid is forced to circulate between a solar energy collection area and a thermal energy utilization device comprising, in combination:

at least one solar collector panel receptive of solar radiation, said panel including an inlet header and an outlet header with a plurality of conduits extending across the surface of said panel and providing passageways interconnecting said headers, whereby a fluid circulating through said panel is heated by said solar radiation;

an insulated storage vessel for receiving said fluid, said vessel having first and second portions and said vessel being adapted for coupling to said device at said first portion of said vessel;

a supply line connected at one end thereof to said outlet header of said collector panel and said supply line being adapted for coupling to said storage vessel at its other end thereof;

a return line connected at one end thereof to said inlet header of said collector panel and said return line being connected to said second portion of said storage vessel at a point remote from said first portion of said storage vessel;

means cooperating with said return line for pumping said fluid from said storage vessel and through said collector panel; and,

means for alternately connecting said supply line to one of said first and second portions of said storage vessel.

13. A solar energy conversion system of the type wherein a heat transport fluid is forced to circulate between a solar energy collection area and a thermal energy utilization device comprising, in combination:

at least one solar collector panel receptive of a solar radiation, said panel including an inlet header and an outlet header with a plurality of conduits extending across the surface of said panel and providing passageways interconnecting said headers, whereby a fluid circulating through said panel is heated by said solar radiation;

an insulated storage vessel for receiving said fluid, said vessel being adapted for coupling to said device at an upper portion of said vessel;

a supply line connected at one end thereof to said outlet header of said collector panel and said supply line being adapted for coupling to said storage vessel at its other end thereof;

a return line connected at one end thereof to said inlet header of said collector panel and said return line being connected to said storage vessel at a point remote from said upper portion or said storage vessel;

means cooperating with said return line for pumping said fluid from said storage vessel and through said collector panel;

means for stratifying said fluid within said storage vessel into layers of varying temperature between said upper portion and said remote point; and,

means for connecting said supply line to said storage vessel so that the hottest layer of fluid in said storage vessel is coupled to said device.

4,027,822

ATTACHMENT DEVICE FOR A SHOWER UNIT

George William Usher, 41, Harlech Road, Leeds 11 Yorkshire, England

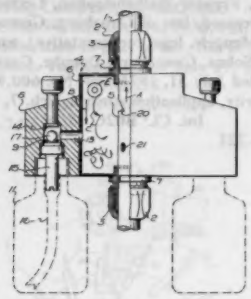
Filed Aug. 25, 1975, Ser. No. 607,533

Int. Cl.[2] B05B *7/28*

U.S. Cl. 239—305 **7 Claims**

1. An attachment device for a shower unit, said device comprising a casing in which is located a tube having connection means at each end whereby the tube can be connected into the supply path along which water flows to the exit port of the shower, a mixing chamber in the casing, deflection means in the tube lying in the path of flow of water through the tube so as to deflect some of such water into the mixing chamber, at least one aperture in the tube which permits the return of water back to the flow through the inside of the tube means permitting additive to be injected into said mixing chamber to be mixed with water deflected thereinto, said deflection

means and aperture or apertures being spaced axially of the tube so that in use water deflected into the chamber circulates



back into the flow in the tube before the flow encounters said deflection means.

4,027,823

LOADING-UNLOADING APPARATUS FOR A VEHICLE

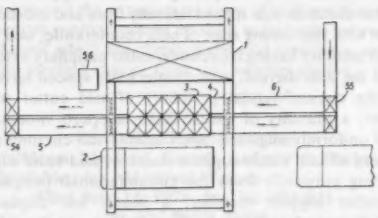
Takashi Kawarai; Yuji Sawada, both of Tokyo; Katsumi Takemoto, Tokyo, and Sadao Mikami, Kobe all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Toyko, Japan

Filed Oct. 29, 1975, Ser. No. 627,010

Claims priority, application Japan, Nov. 18, 1974, 49-132024

Int. Cl.² B65G *67/02*

U.S. Cl. 214—38 CA **2 Claims**



1. An apparatus for loading or unloading a transporter vehicle, comprising:

a travelling frame mounted to be moved by a travel drive device along a guide track provided on a fixed frame;

the travelling frame carrying a fork support member provided with a plurality of lifting forks, which support member can be raised and lowered with respect to the travelling frame by a vertical drive device;

said vertical drive device comprising a hydraulic cylinder, which is designed additionally to incline the fork support member with respect to the travelling frame about an axis parallel to the guide track;

there being provided respective projections mounted at opposite ends of the fork support member;

and tilting frames mounted on respective depending portions of the travelling frame;

each tilting frame having a guide piece for receiving and guiding a respective one of the projections;

a tilt drive mechanism for driving the tilting frames and projections so as to tilt the fork support member about an axis transverse to the guide track;

a shifting device for moving the fork support member transversely to the guide track;

said vertical drive device being operable to lower the forks and the fork support member while maintaining them in a horizontal state by exhausting oil from two end ports disposed on opposite sides of two pistons of the hydraulic cylinder by an equal amount while supplying pressurized oil to within the hydraulic cylinder through a center port of said hydraulic cylinder to project the both pistons by an equal distance, or on the contrary, to raise the forks and the fork support member while maintaining them in a horizontal state by exhausting oil from the center port of said hydraulic cylinder while supplying pressurized oil to within the hydraulic cylinder through the both end ports of said hydraulic cylinder to retract the both pistons by an equal distance; and said vertical drive device being operable to lower one end of said fork support member to a greater extent than the other end thereof, that is, to incline the support member by making the amount of oil exhausted from one end port of said hydraulic cylinder larger than the amount of oil exhausted from the other end port thereof;

the shifting device comprising a hydraulic cylinder mounted on a transverse beam disposed between the depending positions of the travelling frame; the latter hydraulic cylinder being operable to shift a movable member;

the fork support member having a vertical movement guide member which engages with the movable member in such a way that it is movable vertically independently of such movable member but is constrained to move transversely with such movable member.

4,027,824

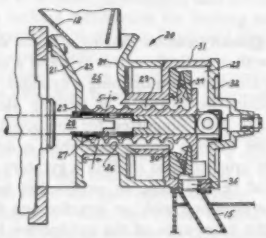
NUT GRINDING MILL

Don W. Fuller, Louisville, Ky., assignor to Grindmaster of Kentucky, Incorporated, Louisville, Ky.

Filed June 7, 1976, Ser. No. 693,494

Int. Cl.² B02C *19/22*

U.S. Cl. 241—152 A **4 Claims**



1. A grinder for peanuts, coffee and the like, comprising:

A. means providing a rear feeding chamber extending downwardly and terminating in a horizontal upwardly-open trough-like passageway having an outlet;

B. means providing a front grinding chamber having an inlet and an outlet;

C. a tunnel interconnecting the trough outlet with the grinding chamber inlet;

D. a conveyor means extendng through the trough and tunnel and operative, when rotated in one direction, to convey the material to be ground into the grinding chamber inlet, said conveyor means including

1. a spiral screw conveyor having sections corresponding to said trough and tunnel; and

E. an axially-aligned succession of L-shaped cuts contained in a corresponding succession of conveyor screw spirals in the conveyor's trough section.

1. each cut

a. having a tangential leg and a radial foot.

b. extending substantially within the radial plane of the corresponding portion of its spiral, and

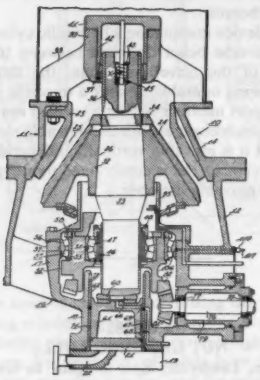
c. opening forwardly in said one direction of rotation.

4,027,825

GYRATORY CRUSHER ECCENTRIC ASSEMBLY REMOVAL SYSTEM

Major Coxhill, Appleton, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed June 8, 1976, Ser. No. 693,781
Int. Cl.² B02C 2/06
U.S. Cl. 241—213 9 Claims



1. In a gyratory crusher having a frame defining a bearing housing, with a vertical central axis and a bottom inner axial extending lower portion defining a cylinder, an axial movable piston within the cylinder, a bearing sleeve assembly, a crusher head shaft supported for rotational and axial movement in the bearing sleeve assembly, a drive eccentric for driving the crusher head shaft in a gyratory movement about the vertical central axis, an antifriction bearing having its outer race confined with an interference fit in the bearing housing, the inner race of the antifriction bearing being engaged on the drive eccentric, a fluid circuit connected to supply fluid under pressure to the cylinder at the side of the piston remote from the end of the crusher head shaft:

a plurality of pusher plates disposed within the cylinder in position to be moved upwardly into forceful engagement with the drive eccentric upon upward movement of the piston;

fluid distribution means in the bearing housing in which the outer race of the antifriction bearing has an interference fit to distribute fluid under pressure around the outer race of the antifriction bearing; and,

a fluid circuit connectible to said fluid distribution means and to the fluid circuit of the crusher to supply fluid under pressure to said fluid distribution means as fluid under pressure is supplied to the cylinder for effecting upward movement of the piston within the cylinder,

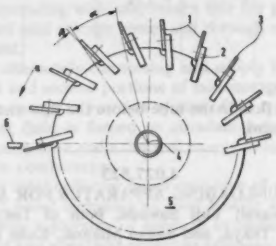
whereby a mechanical upwardly acting pushing force is applied to the drive eccentric and simultaneously therewith fluid under higher pressure is injected around the race of the antifriction bearing to thereby effect a gradual easing of the antifriction bearing from the housing.

4,027,826

CHOPPING MACHINE PARTICULARLY FOR THE HARVEST OF CORN COBS AND THEIR COMMINUTION

Klaus Grimm, Freising-Weihenstephan, Germany, and Alois Mengele, deceased, late of Gunzburg, Germany (by Dieter Kark Paul Mengele, legal representative), assignors to Karl Mengele & Sohne, Guenzburg, Danube, Germany

Filed July 31, 1975, Ser. No. 600,915
Claims priority, application Austria, Feb. 7, 1975, 941/75
Int. Cl.² B02C 18/18
U.S. Cl. 241—221 6 Claims



1. Forage harvester, particularly for corn ear harvesting and pulverizing, comprising a counterknife arranged in the inlet of the harvester and having a cutting edge, a cutter assembly, said cutter assembly comprising a cutter support member rotatable about an axis spaced laterally from and substantially parallel with the cutting edge of said counterknife, said cutter support member having a circumferential periphery extending around the axis thereof, said counterknife spaced outwardly from the circumferential periphery of said cutter support member, a plurality of spaced knife supports mounted on spaced uniformly angularly apart around the circumferential periphery of said cutter support member, said knife supports projecting outwardly from the circumferential periphery of said cutter support member, a beater bar displaceably mounted on and extending outwardly from each said knife support away from said cutter support, each said beater bar having a straight impact edge spaced outwardly from said knife support and said impact edge arranged to cooperate with said counterknife so that said beater bar serves as a forage knife, said counterknife having a first side surface disposed in a plane substantially radial relative to the axis of said cutter support member and facing in the direction opposite to the direction of rotation of said cutter support member and said cutting edge of said couterknife located along the edge of said first side surface closer to said cutter support member, said beater bars each having a side surface leading in the direction of rotation of said cutter support member and extending outwardly in a plane intersecting the periphery of said cutter support member with the plane of the leading side surface disposed at an angle of about 8 degrees to a radial plane of said cutter support member extending through the axis thereof and through the intersection of the impact edge and the leading side surface of said beater bar, and said beater bars being angularly spaced apart about the circumferential periphery of said cutter support member in the range of about 15° to 20° relative to the axis of said cutter support member, and said cutter support member, said knife supports and said beater bars being dimensioned so that the dimension between the adjacent said impact edges on said beater bars is in the range of 60°–100 mm.

4,027,827

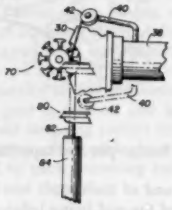
AUTOMATIC ARMATURE WINDING

John M. Biddison, Dayton, Ohio, assignor to The Globe Tool and Engineering Company, Dayton, Ohio

Division of Ser. No. 97,488, Dec. 14, 1970, Pat. No. 3,713,209, which is a continuation-in-part of Ser. No. 67,759, Aug. 28, 1970, abandoned. This application July 17, 1972, Ser. No. 272,635

Int. Cl.[2] H02K *15/09*

U.S. Cl. 242—7.05 B 2 Claims



1. In a machine for winding armatures having commutator tangs, the machine being of the type having a flier for winding wire onto said armatures, cutting means for cutting wire from a freshly wound armature in a winding station and then cutting said wire from the next armature to be wound after said wire is connected to one of the commutator tangs of said next armature, and power operated clamp means for clamping the wire extending from said flier during the interval between the winding of said freshly wound armature and the cutting of said wire from said next armature, the improvement comprising means for moving said clamp means from an extended position wherein said clamp means is positioned to clamp said wire closely adjacent the commutator tangs of said armatures to an intermediate position to take up slack in said wire between the parts thereof which are clamped and said armatures, and to a retracted position remote from said winding station.

4,027,828

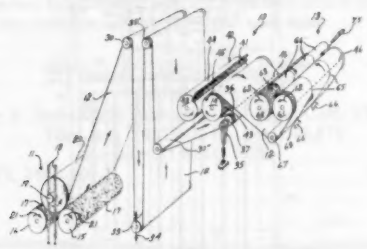
PERFORATING MACHINE

Niall Mathieson, Montreal, Canada, assignor to Mackay Center Specialties, Inc., Montreal, Canada

Filed June 14, 1976, Ser. No. 696,036

Int. Cl.[2] B65H *35/04*

U.S. Cl. 242—56.6 14 Claims



1. A perforating machine for making tear lines in woven or non-woevn fiber sheet material, said machine comprising feeder means for feeding a web of said sheet material, means to maintain said web stretched by applying constant tension to said web, means to stretch said web prior to perforating, perforating means having a cutting blade element supported for periodic contact with said stretched web to cut fibers in said stretch web along a line extending substantially transverse to the direction of said stretch to form a tear line while said stretch is maintained in said web, a support roll having a web engaging outer surface and maintaining said web in a stretch condition through said perforating means, means in said web engaging outer surface to permit said cutting blade element to cut stretched fibers in said stretched web to form a tear line when in contact with said web, and accumulator means to receive said web after tear lines have been made therein.

4,027,829

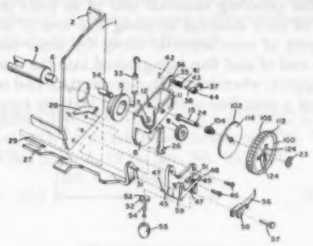
FLYWHEEL AND CLUTCH MECHANISM FOR SAFETY BELT RETRACTOR

Robert Larry Stephenson, Sterling Heights, and Arduino Colasanti, East Detroit, both of Mich., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed May 2, 1975, Ser. No. 574,058

Int. Cl.[2] A62B *35/02;* B65H *75/48*

U.S. Cl. 242—107.4 A 7 Claims



1. In a safety belt retractor for restraining an occupant in a vehicle in event of emergency conditions, said retractor having a spool and a locking mechanism for locking said spool, said locking mechanism including an improved flywheel and clutch mechanism comprising:

a polymeric flywheel having an outer circumference, a planar surface extending from the outer circumference of said flywheel toward the center of said flywheel, a ridge disposed around the outer circumference of said flywheel on at least one side of said planar surface, a recess in the interior of said flywheel, said recess formed by said outer circumferential ridge and said planar surface;

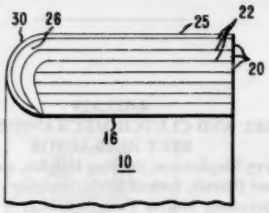
a clutch plate disposed within said recess of said flywheel, said clutch plate having an interior surface disposed adjacent to said planar surface of said flywheel and an exterior surface on the opposite side of said clutch plate from said interior surface, said clutch plate having frictional engagement with said flywheel whereby said clutch plate and said flywheel rotate together under normal conditions;

a mechanical member rigidly affixed to the center of said clutch plate and extending at least from said exterior side of said clutch plate, said mechanical member coupling said flywheel and said clutch plate to the retractor spool to rotate therewith;

a biasing means disposed in said recess of said flywheel adjacent to said interior surface of said clutch plate and pressing against said clutch plate in a direction urging said clutch plate away from the planar surface of said flywheel; and

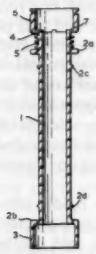
a retaining means disposed around the outer circumferential ridge of said flywheel, adjacent to the exterior surface of said clutch plate and extending partially from said outer circumferential ridge inwardly toward the center of said flywheel, said retaining means retaining said clutch plate in said recess of said flywheel against the bias of said biasing means.

4,027,830
YARN SUPPORT
Thomas Albert Dolan, Old Hickory, Tenn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Filed Nov. 5, 1975, Ser. No. 628,955
Int. Cl.² B65H 75/10
U.S. Cl. 242—118.32 8 Claims



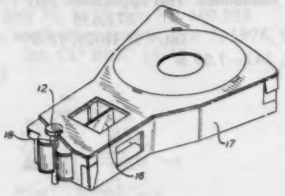
1. A hollow laminated yarn support comprising superposed bonded layers of core material with an external surface of water-resistant covering material and an internal surface, a flap of the covering material and of at least the outermost layer(s) of core material abutting one end of the remaining inner layers of core material along the inner surface of said flap, the end of said flap being faired into the internal surface of the support, whereby the flap protects an end of the support to present a snag-free surface on at least its external face.

4,027,831
SPOOL FOR THREAD
Dieter Rottleb, Gutach, Germany, assignor to Gutermann & Co. Aktiengesellschaft, Zurich, Switzerland
Filed Jan. 19, 1976, Ser. No. 650,302
Claims priority, application United Kingdom, Jan. 29, 1975, 3894/75
Int. Cl.² B65H 75/28
U.S. Cl. 242—125.1 14 Claims



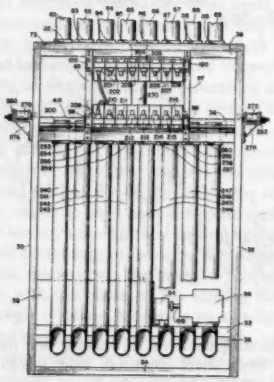
1. A unitary moulding of plastics material comprising:
a. a spool member for carrying thread windings, having a male portion at one end thereof, and
b. a thread trapping member joined to said spool member by frangible bridging means and having a female portion the internal diameter of which is substantially equal to the external diameter of the male portion of the spool member, said male and female portions being adapted, after breaking of the fringible bridging means, to cooperate together so that a surface of the thread trapping member and a surface of the spool member together form a groove for trapping thread.

4,027,832
LEADER-PIN
Ira Lopata, 35 Sutton Place, New York, N.Y. 10022
Filed Apr. 23, 1976, Ser. No. 679,691
Int. Cl.² G03B 1/04; G11B 15/32, 23/04
U.S. Cl. 242—197 1 Claim



1. A combination leader-pin and tape cartridge comprising,
a. a rod,
b. a knob on the end of the rod,
c. the other end of the rod being bifurcated, to receive an elongated strip therebetween,
d. an elongated tube dimensioned to receive the rod by coaxial movement over the one end toward the knob, and having a longitudinal slit in the tube to accomodate the extension of a strip therefrom as the tube is applied to the rod,
e. a strip passed through the bifurcated end of the rod, and extending out of the slit in the tube,
f. a cassette,
g. the remainder of the elongated strip in the cassette,
h. the rod seated externally at the end of the cassette when the strip is wound up into the cassette.

4,027,833
ARTICLE TRANSFER SYSTEM
Clay Bernard, II; William F. Matheny, III, and Billy J. Parker, all of Tulsa, Okla., assignors to Clay Bernard Systems International Ltd., Tulsa, Okla.
Filed Feb. 23, 1976, Ser. No. 660,160
Int. Cl.² B65G 51/24
U.S. Cl. 243—31 20 Claims



19. An article transfer system for transferring an article carrier from one carrier tube to another comprising: a frame having an upper horizontal beam structure and a lower horizontal beam structure spaced below said upper horizontal beam structure; a plurality of incoming carrier tubes for the movement of said carriers therein towards said frame, each

incoming carrier tube having an end attached to said upper beam structure; a vertical hopper positioned between said beam structures having an open upper end for receiving a carrier therein and having a hopper gate at the bottom end thereof for opening said hopper for allowing said carrier to fall from said hopper, means for selectively moving said hopper horizontally to predetermined positions between said beam structures; means associated with each incoming carrier tube for controlling the departure of said carriers from said ends of said incoming carrier tubes individually for allowing a carrier to fall into said hopper when said hopper is positioned beneath a given incoming carrier tube having said carrier located therein; a plurality of outgoing carrier tubes for the movement of carriers therein away from said frame, each outgoing carrier tube having an end attached to said lower beam structure for allowing said carrier to fall thereinto from said hopper when said hopper gate is opened and when said hopper is positioned above said outgoing carrier tube and wherein said means associated with each incoming carrier tube comprises a slide gate attached to each incoming carrier tube for selectively opening said end thereof.

4,027,834

MISSILE NOZZLE CONFIGURATION

Louis F. Heilig, Corona del Mar, and Alson C. Frazer, Santa Ana, both of Calif., assignors to Ford Aerospace & Communications Corporation, Dearborn, Mich.

Filed Apr. 13, 1964, Ser. No. 359,222
Int. Cl.² F41G 7/00
U.S. Cl. 244—3.11 **8 Claims**

1. In a guiding and propulsion system for a missile, the combination which comprises:

communication means mounted in a central portion of the missile toward the aft end thereof and effective to receive and emit radiant energy along a rearward line of view substantially axial of the missile, to guide the missile, and

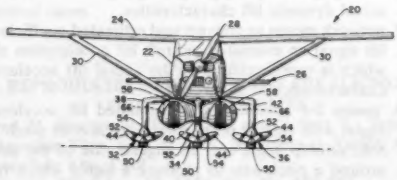
nozzle means mounted on said aft end to propel the missile by generally rearward discharge of fluid, said nozzle means being canted outward from said central portion to keep said line of view free from said fluid.

4,027,835

AIRPLANE

Elmer B. Sachs, 3371 Rexford St., Ventura, Calif. 93003

Filed Aug. 28, 1975, Ser. No. 608,578
Int. Cl.² B64C 25/52
U.S. Cl. 244—101 **1 Claim**



1. An airplane comprising:

a fuselage;

a wing attached to said fuselage;

landing pods attached to said fuselage, each said pod including a landing wheel, each said pod including a ski surface in the area surrounding said landing wheel, each said pod being hydrofoil shaped, whereby said airplane is capable at all times of landing on land, water, snow and ice;

a boat, said boat being securable by securing means to the underside of said fuselage, said securing means being operable to permit detachment of said boat from said fuselage, said boat functioning as a pontoon to buoyantly support said airplane upon water and also functioning as a speed decreasing surface during landing;

said securing means comprises a plurality of movable latches movable between a locked position and unlocked position, each said latch being connected together to operate simultaneously in movement between said locked position and said unlocked position, said latches being operable from within the inside of said fuselage, each said latch connects with a fixed member located on said boat when in the latched position with there being a separate said fixed member for each said latch;

winch means connected to said fuselage, said winch means being connectable with said boat to effect raising and lowering of said boat with respect to said fuselage;

said ski surface being substantially V-shaped in cross-section;

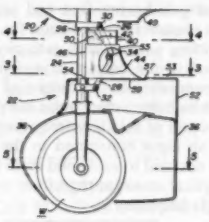
a plurality of suction breaking ribs formed on said ski surface, each said rib being located substantially parallel to the longitudinal axis of said fuselage.

4,027,836

DRAG REDUCING FAIRING FOR LANDING GEAR

Julia K. Seibel, 916 Live Oak Lane, Arlington, Tex. 76012

Filed Mar. 1, 1976, Ser. No. 662,425
Int. Cl.² B64C 25/32
U.S. Cl. 244—103 R **34 Claims**



1. A construction adapted for cooperation with an aircraft landing gear which includes an oleo shock absorber and two torque links, comprising:

a. a first and generally V-shaped member fo rigid attachment to the upper one of the two torque links for movement with the upper torque link; and

b. a second and generally V-shaped member for rigid attachment to the lower one of the two links for movement therewith, and both of said V-shaped members extending rearwardly from the oleo strut to form a streamlined afterbody behind said oleo strut when the strut is fully extended, whereby parasite drag associated with the shock absorber may be reduced.

4,027,837

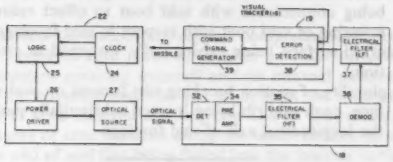
OPTICAL TRACKING LINK UTILIZING PULSE BURST MODULATION FOR SOLID STATE MISSILE BEACONS

Walter E. Miller, Jr., and Jimmy R. Duke, both of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 23, 1969, Ser. No. 869,452
Int. Cl.² F41G 7/00
U.S. Cl. 244—3.16 **7 Claims**

1. An optical tracking link for interfacing with existing tracking systems for providing a complete closed loop track-

ing system, comprising: a movable object to be tracked; a photoemissive beacon within the housing of said movable object for transmitting an optical signal; an optical tracker separate from said object for receiving said optical signal and providing an error signal for directional control of said movable object; said beacon including an electronic high frequency generator, a low frequency modulating means for modulating the high frequency output signal of said generator, and a solid state light emitting source responsive to said modulated signal to transmit optical energy at said modulated frequency; said optical tracker including a light sensitive, solid state, optical detector and a preamplifier responsive to said optical energy, providing a preamplified modulated electrical output signal responsive to the modulated optical input, and means for reducing said output signal to obtain the modulation frequency; and said high frequency generator in said beacon including a clock having an output for generating a

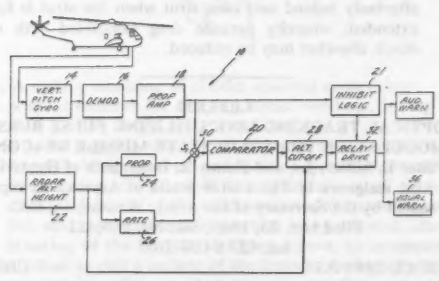


sub-multiple of said high frequency, a first frequency divider circuit having an output and an input connected to an output of said clock and responsive thereto to provide a high frequency output signal therefrom, and a second frequency divider having an input connected to the output of said first divider and being responsive to said high frequency input thereto to provide a sub-multiple, low frequency output therefrom, a gate circuit having first and second inputs and an output, and an amplifier driver circuit for energizing said solid state light emitting source; said gate circuit having the first input connected to the output of said first divider, and the second input connected to the output of said second divider, for providing a high frequency pulse burst output during each alternate half cycle of said low frequency; and said amplifier driver having an input connected to the output of said gate and an output coupled to said solid state light emitting source to stimulate optical emission therefrom synchronous with said modulated high frequency.

4,027,838
HELICOPTER WARNING SYSTEM

Ronald E. Barnum, Trumbull; Franklin A. Tefft, Killingworth, and Louis S. Cotton, Monroe, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 559,452, March 18, 1975, Pat. No. 3,979,717. This application May 3, 1976, Ser. No. 682,437
The portion of the term of this patent subsequent to Sept. 7, 1993, has been disclaimed.
Int. Cl.² G08G 5/04
U.S. Cl. 244—17.11 **5 Claims**

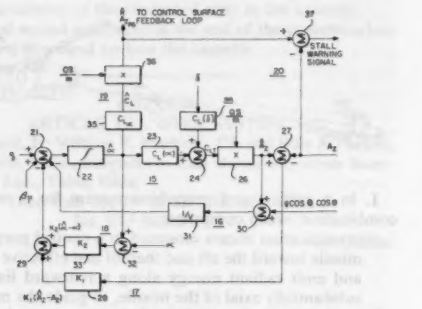


1. For a helicopter of the type that includes a tail stabilizer or tail skid, means for providing a warning signal solely when the tail is in a position that it might contact the ground, said means includes means responsive to the absolute value of the altitude of the helicopter for generating a first signal, means responsive to the absolute value of the attitude of the helicopter for generating a second signal, means responsive to said first signal and said second signal for combining both of said signals for producing a third signal, means for generating a reference signal whose value is indicative of tail ground contact, means for comparing said third signal with said reference signal for energizing a relay upon reaching a predetermined differential therebetween and means responsive to the rate of descent of the helicopter for changing the value of said referenced signal in proportion to said rate of descent, whereby said warning signal is solely actuated whenever the value of the first and second signals are at a predetermined value relative to the rate of descent of the helicopter.

4,027,839
HIGH ANGLE OF ATTACK AIRCRAFT CONTROL SYSTEM UTILIZING A PSEUDO ACCELERATION SIGNAL FOR CONTROL PURPOSES

Richard Paul Quinlivan, Binghamton, N.Y., assignor to General Electric Company, Binghamton, N.Y.

Filed Mar. 30, 1976, Ser. No. 671,830
Int. Cl.² G05D 1/00
U.S. Cl. 244—195 **3 Claims**



1. In an aircraft control system utilizing angle of attack and lift acceleration signals for control purposes, the combination of:

a. means for indirectly producing an estimated angle of attack signal from measured aircraft pitch moment generating signal, including:

1. network means simulating dynamic lift characteristics of an aircraft, said network means providing an output signal proportional to the estimated change of the aircraft coefficient of lift for any variation in angle of attack, said output signal being representative of the actual dynamic lift characteristics,

2. network means to convert said estimated coefficient of lift signal an estimated aircraft lift acceleration signal which is representative of the actual lift acceleration characteristics of an aircraft,

3. means for combining the estimated lift acceleration signal with signals proportional to aircraft pitch rate, roll, sideslip angle and an angular rate of the aircraft around a pitch axis to produce a signal which represents an estimated angle of attack,

b. means responsive to the estimated angle of attack signal to produce a pseudo coefficient of lift signal which is linear with angle of attack over an entire range of operational values and which is thus identical with the assumed aircraft characteristics in the region where an aircraft

coefficient of lift versus angle of attack is linear but deviates from the actual aircraft dynamic lift characteristics where an aircraft rate of change of coefficient of lift decreases and goes to zero with increases in angle of attack, including a newtork having a linear output signal response characteristic over the entire range of input signals and means to apply said estimated angle of attack signal as an input to said network,

c. and means to convert said pseudo coefficient of lift signal to a pseudo lift acceleration signal which is linear over an entire range of aircraft angles of attack.

4,027,840

VEHICLE POSITION INDICATOR WITH RADAR INTERROGATION EACH OF SPACED TRANSPONDERS DISPOSED ALONG A PATHWAY FOR THE VEHICLE

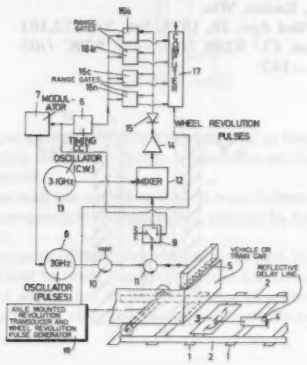
Peter Kenneth Blair, Harlow, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Sept. 30, 1975, Ser. No. 618,184

Claims priority, application United Kingdom, Oct. 15, 1974, 44566/74

Int. Cl.² G01S 9/56

U.S. Cl. 246—122 R **4 Claims**



1. A vehicle position indicating system including a pulse radar transmitter/receiver and a plurality of passive transponders each of which has an antenna coupled to a reflective delay line, different transponders having different delays, the radar and the transponders being arranged for relative movement with respect to each other as a consequence of movement of a vehicle so that passage of a transponder past the radar causes the transmitted radar pulses to be reflected and received at the radar after a time determined by the transponder delay, the radar receiver having a plurality of range gates whereby the received pulses may be classified into time intervals corresponding to the different transponder delays; the radar including a transmitter/receiver coupled to an antenna, and a timing circuit to control the emission of pulses by the transmitter, the timing circuit also controlling the operation of the receiver a predetermined time after the emission of a pulse by the transmitter and the opening of the range gates at predetermined times.

4,027,841

REPRODUCIBLE MOUNTING OF PREALIGNED OPTICAL ASSEMBLIES

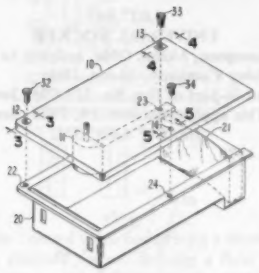
Alfred H. Sturtevant, Palo Alto, and Robert L. Trumbull, Mountain View, both of Calif., assignors to Varian Associates, Palo Alto, Calif.

Filed Apr. 12, 1976, Ser. No. 676,095

Int. Cl.² F16M 11/04

U.S. Cl. 248—19 **21 Claims**

1. An assembly comprising a base member and a mating member; said base member having first, second and third noncollinearly disposed mounting holes; said mating member having first, second and third matching holes; first, second and third locating means; said mating member being mountable upon said base member such that said first locating means passes through said first mounting hole and said first matching hole, said second locating means passes through said second mounting hole and said second matching hole, and said third locating means passes through said third mounting hole and said third matching hole; said base and mating members being configured to be in contact with each other, when assembled, at three noncollinear areas, the dimensions of said three contact areas being small relative to the distance between any two of said contact areas; said first mounting and matching



holes being configured to preclude translational motion of said mating member relative to said base member in a direction parallel to a plane defined by said three small contact areas when said first locating means passes through said first mounting and matching holes; said second mounting and matching holes being configured to allow rotational motion of said mating member relative to said base member only about a lne joining said first and second mounting holes when said second locating means passes through said second mounting and matching holes; said third mounting and matching holes being configured to preclude rotational motion of said mating member relative to said base member about said line joining said first and second mounting holes when said third locating means passes through said third mounting and matching holes.

4,027,842

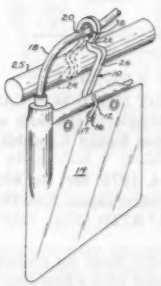
FLEXIBLE HANGER MEMBER FOR DRAINAGE BAGS AND THE LIKE

Herbert Mittleman, Deerfield, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Sept. 24, 1975, Ser. No. 616,218

Int. Cl.² F16M 13/00

U.S. Cl. 248—75 **6 Claims**



1. A hangar for a drainage bag or the like which comprises: an elongated body, bag suspending means at one end of said body, means for engaging a hangar support, said means being

carried at the other end of said body, and a holding part for supporting a portion of a length of tubing in transverse relation to said hangar support engaging means, the improvement comprising, said holding part including a flange of greater width than said body, said flange defining an eye portion for receiving and holding said tubing for the prevention of kinking thereof, said hangar support engaging means comprising an elongated member defining an acute angle of no more than substantially 45° to said body, for added hanging stability, said hangar being resilient, for improved gripping retention of a hanger support.

4,027,843

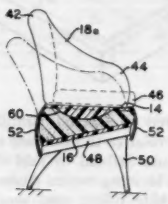
UNIVERSAL ROCKER

Donald R. Thompson, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 371,005, June 18, 1973, abandoned. This application Dec. 19, 1975, Ser. No. 642,519

Int. Cl.² A47C *3/02*

U.S. Cl. 248—375 **3 Claims**



1. A chair suitable for rocking comprising in combination:
A. an upper seat;
B. a lower platform, and
C. a central unit comprising a thickness of an organic, volume-compressible, flexible polyether based urethane foam having a density of 2–5 pounds per cubic foot, a maximum compression set of 20 percent, and indention and compression load deflections not exceeding 50 percent, said foam bounded by substantially rigid upper and lower sections of a noncompressible, high density foam molded to the flexible foam to form a single integral unit, the upper section securely attached to the seat and characterized by a downwardly directed nodal protrusion penetrating into the flexible foam to increase the shear surface between the rigid upper section and the flexible foam, the lower section securely attached to the platform, said central unit providing complex pitch and roll motion about a vertical axis through the center of gravity when the chair is occupied.

4,027,844

BIG-END-DOWN INGOT MOLD FOR CASTING METAL

Takaho Kawawa, and Masaharu Ito, both of Fukuyama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

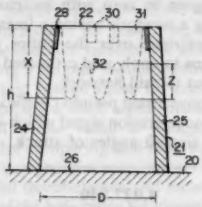
Filed June 14, 1976, Ser. No. 695,458

Claims priority, application Japan, June 18, 1975, 50-74053

Int. Cl.² B22D *15/00, 7/06*

U.S. Cl. 249—111 **9 Claims**

1. A big-end-down ingot mold for casting metal having a side wall, and further comprising a heat insulating chamber in said side wall, the cross-sectional area of said chamber gradually increasing toward the top of the ingot mold, the depth of said chamber being smaller than a difference between the height of the interior of the mold and the bottom length of the inside of a narrower wall of the mold where the interior of the mold has a rectangular cross section and being smaller than the difference between the height of the interior of the mold



and the bottom length of the inside of a wall of the mold where the interior of the mold has a square cross section.

4,027,845

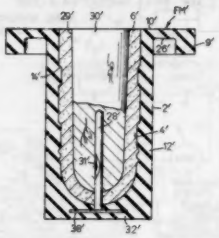
FLEXIBLE MOLD INCLUDING RIGID ENCAPSULATED MANDREL

Raymond M. Putzer, Racine, Wis., assignor to Precision Flexmold, Inc., Racine, Wis.

Filed Apr. 28, 1975, Ser. No. 572,101

Int. Cl.² B28B *7/16, 7/28;* **B29C** *1/06*

U.S. Cl. 249—142 **5 Claims**



1. Apparatus for molding seamless articles comprising a generally hollow, one-piece distensible flexible mold having a bottom wall and side walls of such thickness that the mold is self-supporting and supports the weight of a molding material poured therein without distortion of said mold, and a rigid upwardly extending core member having a radially extending flange around the periphery of its lower portion fixedly embedded in the bottom wall of said mold and positioned intermediate the thickness of said bottom wall, and a downwardly extending core member received in said mold and defining an annular chamber therewith, said downwardly extending core including an axially extending bore for receiving therein said upwardly extending core member in mating engagement such that said downwardly extending core member is supported and positioned with respect to said mold by said upwardly extending core, said core members and said mold defining a generally annular chamber for receiving molding material.

4,027,846

PANEL FOR CASTING CONCRETE

Sylvain Caplat, Le-Blanc-Mesnil, France, assignor to Societe Les Coffrages Madernes, Paris, France

Continuation of Ser. No. 318,034, Dec. 26, 1972, abandoned. This application Dec. 31, 1975, Ser. No. 645,907

Claims priority, application France, Dec. 28, 1971, 71.47090

Int. Cl.² E04G *9/00, 17/00;* **E04C** *2/32*

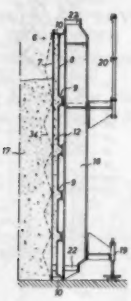
U.S. Cl. 249—189 **7 Claims**

1. A panel for casting concrete comprising
a front casting wall of steel sheet,

a rear wall of steel sheet, said front casting wall facing said rear wall and being spaced therefrom, and

a layer of expanded rigid polyurethane foam of high density cast in situ between said walls and joining said walls together, the mechanical properties of the cast foam being such that the panel behaves under the load of the concrete as a beam, said mechanical properties being such that:

the polyurethane layer has a sufficient rigidity to prevent relative displacement of said two walls and to resist the shear-tensile forces and as a consequence has a density of at least 200kg/m³;



said front casting wall has a thickness of at least 2.5mm for resisting the tensile forces applied thereto by bending of the panel,

said rear wall has a thickness of at least 2.5mm for resisting the compression forces applied thereto by bending of the panel,

the adherence of the polyurethane layer with the walls being sufficient to resist the shear-tensile forces and being obtained solely due to the properties of adherence of the polyurethane after polymerization in situ between the two walls.

4,027,847

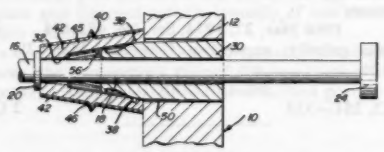
EXPANDABLE TIE ANCHOR

Clavin R. Johnson, 1813 Juniper Drive, Alamogordo, N. Mex. 88310

Filed Mar. 26, 1976, Ser. No. 670,979

Int. Cl.² E04G *17/08*

U.S. Cl. 249—190 **12 Claims**



1. A form tie construction including an elongated rod having an abutment on one end portion thereof spaced a predetermined distance inwardly of the terminal end of said one end portion, a tubular circumferentially continuous sleeve slidably mounted on said one end portion outwardly of said abutment for endwise abutting engagement with the latter, said sleeve including means rendering said sleeve substantially incompressible in an axial direction thereof, but expandable in radial directions, a wedge member slidably mounted on said one end portion outwardly of said sleeve and including wedge portions thereof receivable within and operative to radially expand the adjacent end of said sleeve upon shifting of said wedge member along said rod toward said abutment.

4,027,848

THERMALLY CONTROLLED FLUID FLOW REGULATING OR SHUT-OFF VALVES

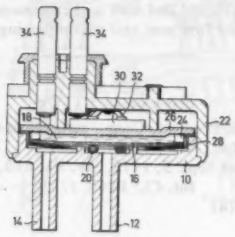
Waldemar Dietmar Mundil, Pulheim, Germany, assignor to Deutsche Vergaser GmbH & Co Kommanditgesellschaft, Neuss, Germany

Filed Oct. 14, 1975, Ser. No. 622,379

Claims priority, application Germany, Nov. 13, 1974, 2453757

Int. Cl.² F16K *31/04*, *31/56*

U.S. Cl. 251—11 **8 Claims**



1. A fluid flow control valve comprising a thermally responsive bimetallic element, means defining a fluid flow passage through said valve, means defining a valve seat located to be engaged and disengaged by said bimetallic element to closed and open said fluid flow passage, a thermally conductive member, means mounting said thermally conductive member together with said bimetallic element to define therebetween an enclosed volume insolated from said fluid flow passage, and temperature varying means mounted on said thermally conductive member in thermally conductive relationship with said bimetallic element operating to control said bimetallic element to open and close said valve.

4,027,849

VALVE FOR AGGRESSIVE FLUIDS

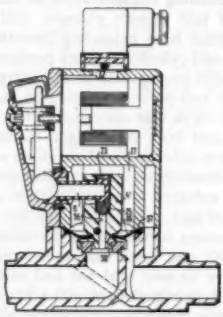
Fritz Muller, Beim Bahnhof, D 7119 Criesbach, Germany

Filed Mar. 31, 1975, Ser. No. 563,409

Claims priority, application Germany, Apr. 4, 1974, 2416359

Int. Cl.² F16K *31/10*

U.S. Cl. 251—30 **18 Claims**



1. A valve arrangement for aggressive fluids, the arrangement comprising: a plurality of plastic components including a valve body with inlet and outlet connections, a valve seat, means selectively movable toward and away from the valve seat for controlling a flow of the aggressive fluid, guide means for guiding the movement of said controlling means in a direction perpendicular to a valve seat plane, a two-armed lever means pivotally mounted on an axle extending substantially

parallel to the plane of the valve seat, means provided in said controlling means for accommodating a first of said two-armed lever means, said first arm of said two-armed lever means extending substantially parallel to the plane of the valve seat, the other arm of said two-armed lever means extending substantially at a right angle to said first arm, an actuating means operatively associated with said other arm, a movable seal interposed between said other arm and said controlling means, the movable seal having an end portion terminating in proximity to the pivot axis of said two-armed lever means, said seal being fashioned as a diaphragm bellows having a hose-like extension adjoining a central area thereof with one of said extension being closed and with said extension extending over the length of said first arm and encompassing the same.

4,027,850

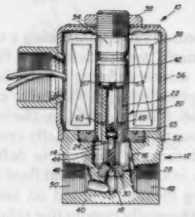
SOLENOID VALVE

Walter E. Allen, Prospect, Conn., assignor to Peter Paul Electronics Co., Inc., New Britain, Conn.

Filed Sept. 5, 1975, Ser. No. 610,748

Int. Cl.² F16K *31/06*

U.S. Cl. 251—141 **6 Claims**



1. The combination comprising an armature assembly and a valve seat insert for a solenoid operated fluid control valve, said armature assembly including an impact plunger and a seal pin mounted in said plunger for reciprocal movement relative thereto and having a cylindrical shank portion projecting outwardly from said plunger, said seal pin having a seating surface at its outer end, said insert having a base portion for assembly in a cavity in the body of the control valve and an integral guide portion projecting inwardly from said base portion and toward said impact plunger, said guide portion having a generally radially disposed abutment surface at its inner end for abutting engagement with an associated outer end portion of said impact plunger, said insert having a stepped cylindrical bore extending therethrough in coaxial alignment with said cylindrical shank portion for communicating with an outlet passageway in the valve body, said bore having an outer end portion defining an outlet orifice and a valve seat, said valve seat surrounding the inner end of said outlet orifice, said bore including a diametrically enlarged inner end portion defining a seal pin guide surface and having a diameter substantially equal to the diameter of said cylindrical shank, said enlarged inner end portion receiving an associated portion of said cylindrical shank for sliding movement therein, said seating surface being movable into and out of engagement with said valve seat, said impact plunger being movable relative to said seal pin and said base when said seating surface is in engagement with said valve seat, said seal pin guide surface being in surrounding sliding engagement with an associated portion of said clindrical shank at all times when said insert-armature assembly is assembled in said control valve and guiding said seal pin in its movements toward and away from said valve seat, said guide portion having a generally radially extending hole therethrough communicating with a chamber of the control valve and with said enlarged bore portion immediately inwardly of said valve seat and cooperating with said enlarged bore portion, said valve seat and said orifice to provide a fluid flow path from the chamber to the outlet passageway when said seating surface is out of engagement with said valve seat.

4,027,851

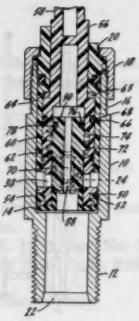
FAUCET VALVE AND SEAL THEREFOR

Walter F. Schlotman, Bay Village, Ohio, assignor to Stanadyne, Inc., Windsor, Conn.

Filed June 27, 1975, Ser. No. 590,848

Int. Cl.² F16K *25/00*

U.S. Cl. 251—172 **14 Claims**



1. A fluid valve including hollow sleeve means, an axial inlet at one end of said sleeve means, at least one outlet in said sleeve means,

seal means attached to said sleeve means adjacent its inlet, said seal means having an inner portion, an end portion lying flat against an end of said sleeve means and a portion extending outside of and interlocked with said sleeve means,

adjustable valve means positioned within said sleeve means and movable toward and away from said sleeve means inlet and said annular seal means, said valve means having an end portion arranged for sealing contact with said seal means inner portion, movement of said valve means against the direction of flow through said sleeve means inlet into contact with said seal means closing said fluid valve, said seal means inner portion and end portions being axially movable in response to closing movement of said valve means.

4,027,852

VALVE DISC AND SEAT CONSTRUCTION

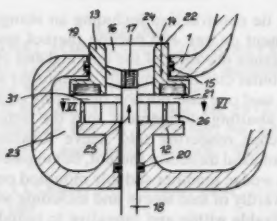
Bernhard W. Braukmann, Am. Posenbag 1, D-695 Mosbach, Germany

Filed Mar. 27, 1974, Ser. No. 455,174

Claims priority, application Germany, Mar. 29, 1973, 2315626

Int. Cl.² F16K *1/34*

U.S. Cl. 251—333 **2 Claims**



1. A valve comprising a valve body having a first aperture,

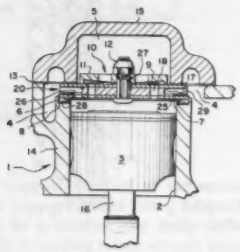
a first seal in said first aperture, a valve disc integral with said valve body and surrounding said first aperture, a movable stem in said first aperture engaging said first seal, a second aperture in said valve body opposed to said first aperture, a second seal in said second aperture, a valve element in said second aperture engagable with second seal, said movable stem being attached to said valve element to move the latter into contact with said valve disc and away therefrom, one of said valve disc and said valve element having a raised zig zag surface forming a seat.

4,027,853

VALVE PLATE HAVING IMPROVED SUCTION GAS FLOW PATH

Peter J. Linnert, La Crosse, Wis., assignor to The Trane Company, La Crosse, Wis.

Filed May 3, 1976, Ser. No. 682,528
Int. Cl.² F16K *51/00*
U.S. Cl. 251—361 **17 Claims**



1. A valve plate for use in a reciprocating gas compressor comprising

a. a lower member at least a portion of which defines a first substantially planar surface of generally annular configuration and having suction port means disposed adjacent a radially inner portion thereof,

b. an upper member at least a portion of which defines a second substantially planar surface of generally annular configuration, said first and second surfaces facing each other in spaced relationship,

c. axially extending means located adjacent radially inner portions of said first and second surfaces, and inwardly of said suction port means, said axially extending means defining therewith a suction gas flow area of generally annular configuration between said first and second planar surfaces,

d. discharge port means passing axially through said valve plate and disposed radially inwardly of said suction gas flow area, and

e. a corrugated element located in said suction gas flow area, the corrugations thereof defining suction gas flow paths in communication with said suction port means.

4,027,854

SELF-EQUALIZING LINKAGE FOR WELL DERRICKS

William J. Mounton, Jr., Box 10515, New Orleans, La. 70181

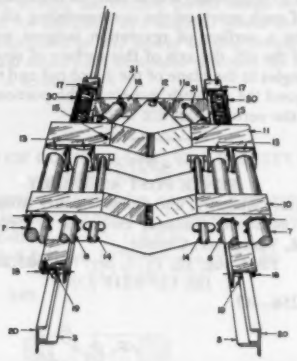
Filed Oct. 15, 1975, Ser. No. 622,583
Int. Cl.² B66F *3/24*
U.S. Cl. 254—29 R **13 Claims**

1. In a hydraulic ram system for well derricks using force-producing rams paralleled in pairs, a cross-head structure for summing and transferring the forces from the heads of the rams to common load means, the structure comprising

a. a pin trolley carriage restricted for translation only along a path parallel to the axes of the rams, said carriage carrying

b. a pivot pin with centerline at a right angle to the plane through the axes of the rams of a pair, and positioned between said axes, and

c. a cross-head beam pivotally mounted on said pin and bridging said rams to receive their forces,



d. the forces being received on rolling-sliding convex faces on the said beam from each ram, said faces being located between the heads of the rams and the pivot pin, and

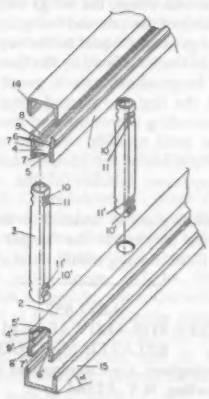
e. common load means attached to said structure.

4,027,855

GUARD RAIL

Réne Lauzier, Ruy, France, assignor to CEGEDUR, Societe De Transformation De L'Aluminum Pechiney, Paris, France

Filed Feb. 2, 1976, Ser. No. 654,077
Claims priority, application France, Mar. 21, 1975, 75.09565
Int. Cl.² B21F *27/00*
U.S. Cl. 256—21 **6 Claims**



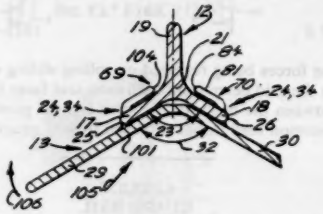
1. Guard rail comprising an inclined handrail and vertical bars of a width L in the plane of the guard rail and which forms with the horizontal an angle capable of varying between two limits $\alpha-\delta\alpha$ and $\alpha+\delta\alpha$, the said handrail being itself essentially constituted by an open profile section of generally U-shaped cross-section in which the side walls of the profile extend in the direction away from the handrail and with the web of the profile being of a thickness *l*, ribs extending inwardly from said side walls, perforations in the web of the hand rail dimensioned to allow the ends of the vertical bars to traverse the said web, at least one notch in the end portion of said vertical bar

to be secured by clipping on ribs extending inwardly from the side walls of the handrail, said guard rail being characterized in that on the one hand the perforations in the web of the hand rail have in the plane of the guard rail a horizontally measured width $L + e\,(tg\delta\alpha/cos\alpha)$ and in that, on the other, the bearing surface of each notch on the corresponding rib of the rail is defined by a surface of revolution tangent to the bearing surface of the rib, the axis of this surface of revolution being at right-angles to the plane of the guard rail and traversing this plane beyond the rail with respect to the portion of the plane in which the vertical bars are located.

4,027,856
FENCE POST ASSEMBLY

Ernest James Kingsley, and Horst Guenter Mendgen, both of West Vancouver, Canada, assignors to Zygon Industries Limited, Vancouver, Canada

Filed Aug. 18, 1975, Ser. No. 605,269
Int. Cl.² B21F 27/00
U.S. Cl. 256—47 **10 Claims**



1. A fence post assembly including:
   i. an elongated, generally Y sectioned post having first, second and third flanges extending from an inner core portion of the post, the first and second flanges having outer edges and being inclined to each other at a main angle to define a V therebetween, each outer edge having two longitudinally spaced notches,
   ii. a V sectioned anchor plate having a longitudinal axis and first and second wings, the wings extending on generally opposite sides of the axis and being inclined to each other at an angle generally equal to the main angle of the post so as to fit in the V defined by the first and second flanges when the longitudinal axis is generally parallel to the fence post, the first and second wings each having a pair of tangs extending therefrom and spaced apart longitudinally at an axial spacing equal to axial spacing of the respective notches on the post, the tangs being adapted to engage respective notches in the outer edges of the flanges,

so that the anchor plate is secured to the post by the tangs which engage the notches in the flanges and essentially prevent the plate from moving axially relative to the post.

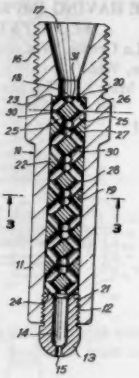
4,027,857
STATIC MIXER FOR FLOWABLE MATERIALS, AND RELATED METHOD

Ashley D. Cunningham, c/o Cunningham Industries, Inc., P.O. Box 353, Pawling, N.Y. 12564

Filed Feb. 23, 1976, Ser. No. 660,059
Int. Cl.² B01F 5/00
U.S. Cl. 259—4 AB **13 Claims**

6. A static mixing unit for mixing flowable materials, which comprises
   a. a substantially solid body having a longitudinal axis and provided with an inlet end and an outlet end,
   b. a plurality of flow passages formed in said body,
   c. a first plurality of said flow passages communicating with said inlet end and extending angularly to the outer surface of said body,
   d. each of said flow passages converging from said outer surface centrally through said body to said longitudinal axis whereby all of said flow passages intersect at a common area along the axis of said body,
   e. said flow passages diverging from said common area to said outer surface and reconverging and diverging to intersect at one or more additional common areas at the axis of said body to provide a plurality of series related mixing stages, and
   f. said flow passages communicating with the outlet end of said body.

11. The method of mixing a stream of flowable materials comprising the steps of
   a. passing the stream through the inlet end of a static mixer,
   b. dividing the stream into a plurality of sub-streams,



   c. diverging the sub-streams outwardly away from a central axis extending in the direction of flow of the stream to the outer surface of said static mixer,
   d. thereafter converging the sub-streams toward said central axis until they intersect and blend in a common area at said axis,
   e. increasing the velocity of the flowing materials momentarily as said materials flow through said common area,
   f. repeating steps (b) through (d) until the stream is thoroughly mixed, and
   g. reuniting the sub-streams at the outlet end of said static mixer.

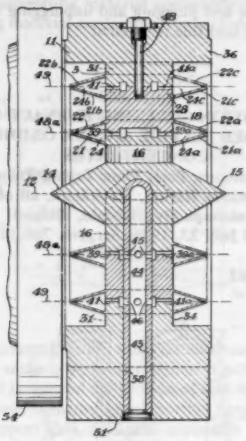
4,027,858
APPARATUS FOR MIXING

Edward V. Dettmer, Bay City, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed June 29, 1976, Ser. No. 700,938
Int. Cl.² B01F 15/02, 5/04
U.S. Cl. 259—4 R **3 Claims**

1. A fluid dispenser or mixing aid having a dispenser body, the dispenser body having a first end, a second end, and a longitudinal axis, the dispenser body defining a generally centrally disposed mandrel, the mandrel having a first end and a second end, the first and second ends of the mandrel being disposed generally along the longitudinal axis, the body defining at least one generally concentric first passageway generally surrounding the mandrel, the body defining a first generally annular dispensing means disposed about said first passageway and affixed to the mandrel, the first dispensing means having defined therein a fluid passage means and an annular dispensing portion, the fluid passage means being in operative connection with the first dispensing means, the dispensing portion having first and second concentric annular lip means, the first and second lip means being generally concentric about the mandrel, the lip means converging at a location remote from the supply passage and in the direction of the first body end, the lip means being deflectable by fluid pressure internal and external thereto, the lip means and the body defining an en-

closed generally annular plenum, the body defining a support means external to the dispensing means and a second plurality of passageways radially outwardly disposed from the first dispensing means, the second plurality of passageways extending generally parallel to the first plurality of passageways, the

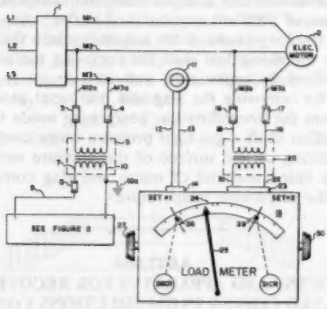


body defining a support external to the second plurality of passageways, the support means being adapted to be operatively connected to a conduit, the body defining generally radially outwardly extending minor stream supply passages in communication with said fluid passage means.

4,027,859
AUTOMATIC CONTROL OF LIQUID ADDITION TO A MIXTURE BY POWER SENSING

Milton Stone, Chicago, Ill., assignor to Pettibone Corporation, Chicago, Ill.

Filed May 25, 1976, Ser. No. 689,873
Int. Cl.² B01F *15/02*
U.S. Cl. 259—18 **13 Claims**



1. In the process of mixing the materials of a liquid-dependent-viscosity mixture and said liquid in a mixing machine powered electrically, the improvement of automatically controlling the trim liquid, comprising:

a. means for sensing the temperature of said mixture, and for signalling at a selected temperature,

b. initiating means for enabling said temperature means signal,

c. means responsive to said temperature means signal when enabled by said initiating means, for producing a pulsing signal,

d. means for supplying liquid under pressure to the mixing machine when enabled,

e. means for enabling said liquid means in a pulsing manner in response to said pulsing signal,

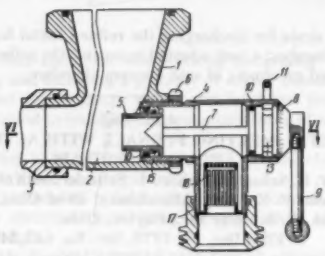
f. means for sensing the electric power taken by said machine and for signalling at a selected power level, and

g. means responsive to said power sensing means signal to disable said liquid control means, whereby the admission of liquid is terminated.

4,027,860
METHOD OF CONTROLLING THE DENSITY OF A PLUGGING FLUID

Alexandr Sergeevich Mamvriisky, prospekt Revoljutsii, 26/36, kv.7, and Alexandr Mikhailovich Lapchenko, ulitsa Moskovskaya, 68, both of Grozny, U.S.S.R.

Filed July 24, 1975, Ser. No. 598,550
Int. Cl.² B28C *7/04*
U.S. Cl. 259—149 **6 Claims**



1. A method of controlling the density of a fluid, such as a plugging fluid comprising a mixture of dry solid material and a liquid, comprising the steps of supplying continuously a stream of said dry solid material and a flow of a carrier liquid, pre-shaping the flow of said carrier liquid into a substantially flat jet, mixing said flow of the carrier liquid with said dry solid material in a mixing zone, and rotating said substantially flat jet of said carrier liquid about the longitudinal axis thereof in the mixing zone through an angle corresponding to a required density of the fluid being prepared.

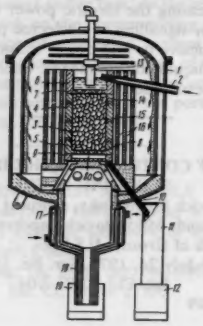
4,027,861
APPARATUS FOR CONTINUOUS VACUUM-REFINING OF METALS

Vladimir Semenovich Cherednichenko, ulitsa Zorge, 269, kv. 79; Gennady Ivanovich Orlov, ulitsa Vatutina, 27, kv. 20, both of Novosibirsk; Aron Semenovich Mikulinsky, ulitsa Bosova, 1, kv. 54, Istra Moskovskoi oblasti; Jury Semenovich Arzamastsev, ulitsa Zorge, 267, kv. 58, Novosibirsk; Vladimir Vasilievich Efremkin, ulitsa Gurzufskaya, 15a, kv. 23, Sverdlovsk, all of U.S.S.R.; Valentin Alexeevich Nikitin, deceased, late of Kishinev, U.S.S.R.; by Valentina Kuzminichna Nikitina, administrator, and by Dmitry Valentinovich Nikitin, administrator, both of ulitsa Zelinskogo, 8, kv. 50,, Kishinev, both of U.S.S.R.

Filed Apr. 2, 1976, Ser. No. 673,106
Int. Cl.² C22B *9/04*
U.S. Cl. 266—149 **4 Claims**

1. An apparatus for continuous vacuum-refining of metals, comprising: a cylindrical vacuum chamber; an evaporator for preliminary melted impure metal, said evaporator being accommodated in said vacuum chamber and constituting a vessel with a granulated loose material filling said vessel to capacity to provide a maximum evaporating surface washed by the molten metal being refined; a heater with a current lead to feed energy thereto for heating said vessel together with the metal to a volatilization temperature of low-boiling impurities; side walls of said vessel fitted with outlets for the effluence of

the low-boiling impurities liberated during metal heating; a condensate header mounted under said vacuum chamber and adapted to collect the impurities; the bottom of said vessel



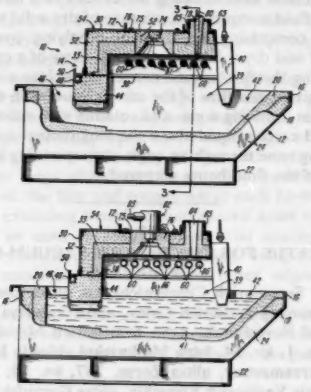
with a drain for discharging the refined metal from said vacuum chamber; a tank adapted to receive the refined metal and disposed externally of said vacuum chamber.

4,027,862

METAL MELTING FURNACE WITH ALTERNATE HEATING SYSTEMS

Carl W. D. Schaefer; Richard L. Schaefer, both of Dayton, and Gordon F. Kennedy, Miamisburg, all of Ohio, assignors to Frank W. Schaefer Inc., Dayton, Ohio

Filed Dec. 19, 1975, Ser. No. 642,243
Int. Cl.² C21B *11/00*
U.S. Cl. 266—160 **1 Claim**



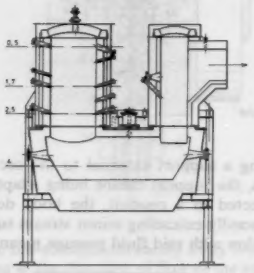
1. In a furnace structure for a reverberatory metal melting furnace of the type having a lower furnace structure for holding metal and an upper furnace structure supported on top of the lower furnace structure and having means including sidewalls and a roof supported by said sidewalls cooperating with the lower furnace structure and molten metal therein defining a heating chamber, the improvement permitting conversion between the use of a fossil fuel fired radiant heating element and an electrically operated radiant heating element including means defining an aperture extending through said roof and a roof portion around said aperture for supporting said fossil fuel fired element in said aperture, means defining a flue for exhausting gases from said heating chamber when using said fossil fuel fired element, means defining mutually aligned apertures adapted for receiving the ends of said electrical resistance heating elements in said sidewalls, and means for plugging said apertures and said flue so that said fossil fuel fired heating element may be used for melting metal in said lower furnace structure or said electrical resistance heating element may be used for melting metal in said lower furnace structure and the conversion from one of said elements to the other of said elements may conveniently be made by installing the desired heating element in said aperture or apertures provided therefor and plugging and unplugging said aperture or apertures and said flue as needed.

4,027,863

SUSPENSION SMELTING FURNACE FOR FINELY-DIVIDED SULFIDE AND/OR OXIDIC ORES OR CONCENTRATES

Olavi August Aaltonen, Pori; Timo Tapani Talonen, Nakkila, and Seppo Untamo Härkki, Haukilahti, all of Finland, assignors to Outokumpu Oy, Helsinki, Finland

Filed July 23, 1976, Ser. No. 708,118
Int. Cl.² C22B *5/00*
U.S. Cl. 266—162 **4 Claims**



1. A suspension smelting furnace for the suspension smelting of a finely-divided raw material selected from sulfide and oxide ores and concentrates, having a horizontal lower furnace to which the lower ends of at least one vertical suspension reaction shaft and one rising-flow shaft have been connected, with devices at the upper end of the suspension reaction shaft for producing a suspension of the finely-divided raw material with an oxygen containing gas and for directing this suspension downwards in the reaction shaft perpendicularly to the surface of the melt accumulated in the lower furnace in order to discharge most of the suspension into the melt, with means in the rising-flow shaft for removing the residual suspension from its upper part, and with means in the lower furnace for removing the slag and the metal as well as the matte from the lower furnace, comprising inside the suspension reaction shaft a gas-tight pressure water cooling system for producing on the surface of the pressure water cooling system a lining material of matte and slag components to control the suspension temperature.

4,027,864

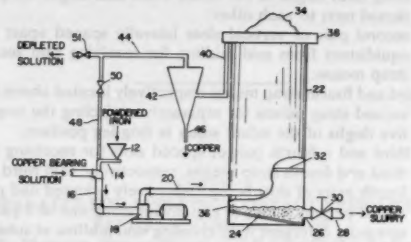
PROCESS AND APPARATUS FOR RECOVERING DISSOLVED COPPER FROM SOLUTIONS CONTAINING COPPER

Jan Hulsebos, Cranbury, N.J., assignor to Cities Service Company, Tulsa, Okla.

Continuation of Ser. No. 555,014, March 3, 1975, abandoned, which is a division of Ser. No. 293,616, Sept. 29, 1972, which is a continuation-in-part of Ser. No. 128,435, March 26, 1971, abandoned. This application June 16, 1976, Ser. No. 696,458
Int. Cl.² C22B *15/12*
U.S. Cl. 266—170 **3 Claims**

1. An apparatus for recovering dissolved copper which comprises means for mixing a powdered iron with said solution for a sufficient time to allow said iron to reduce said copper in said solution to metallic copper, a container wherein

said means for mixing is tangentially connected so that said solution enters said container circumferentially to reduce the flow velocity of said solution containing metallic copper to allow said copper to settle to the bottom of said container, means for withdrawing said settled metallic copper from the bottom of said container, said container additionally includes a means for supporting material containing iron, said means for supporting material containing iron includes a support grid



horizontally mounted within said container supporting a mass of particulate scrap iron, said container is substantially cylindrical and said tangential connection of said means for mixing to said container is in the lower portion thereof and underneath said support grid, and said apparatus additionally includes a means for passing upwardly through said scrap iron a solution containing residual copper values, and a means for secondary removal of entrained residual copper valves from the solution passed upwardly through said scrap iron.

4,027,865

REINFORCED DISK SPRINGS

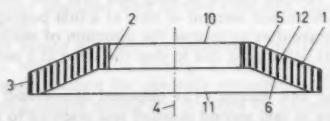
John H. Greenwood, Clophill, England, and Emmerich Robitschek, Zurich, Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed July 22, 1975, Ser. No. 598,008

Claims priority, application Switzerland, July 24, 1974, 10204/74; May 12, 1975, 6036/75

Int. Cl.² F16F *13/00*

U.S. Cl. 267—148 **29 Claims**



1. A reinforced disk spring comprising:

a conical shell of elastically deformable material having an upper plane or convex surface, a lower concave surface, an outer bounding surface, and an inner bore; and

a plurality of reinforcing elements embedded within said conical shell and disposed such that each of said elements is a three dimensional body of revolution and coaxial with the spring axis, said elements also being disposed throughout said shell in a radially extending array,

whereby the reinforcing elements present directed resistance to specific deformations occurring when the spring is axially loaded.

4,027,866

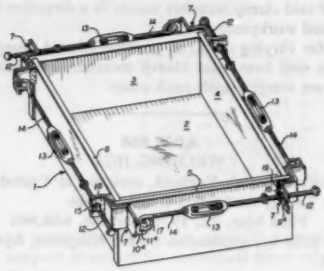
MULTI-FACE CLAMP FOR MANUFACTURING OR REGLUING OF DRAWERS, CHAIRS OR THE LIKE

Arthur Ruggiero, 68 Soundview St., New Rochelle, N.Y. 10805

Filed Dec. 29, 1975, Ser. No. 644,627

Int. Cl.² B25B *1/20*

U.S. Cl. 269—41 **2 Claims**



1. A multi-face clamp for woodworking comprising

a clamping unit including a plurality of corner pieces,

each of said corner pieces defining at least two pressure faces adapted to engage complementary faces of a work piece,

two threaded bolts extending from and operatively connected with said corner pieces,

one of said threaded bolts having threads formed in an opposite direction from those of the other of said threaded bolts,

a turn-buckle disposed between each pair of adjacent corner pieces and receiving in its inner threads the respective free end portions of said threaded bolts, so that upon turning of said turn-buckle the pressure faces of said corner piece exert pressure upon said complementary faces of said work piece,

wherein at least one of said threaded bolts has a plurality of nuts, some of said nuts being adjustable along said of one said threaded bolts, and

means on said corner piece for retaining said one of said threaded bolts selectively in a plurality of end positions.

4,027,867

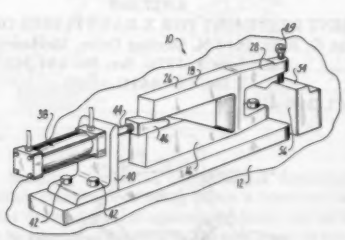
WORKPIECE HOLDER

Bernard M. Pollington, Finkle Road, McBain, Mich. 49657

Filed Jan. 30, 1976, Ser. No. 653,733

Int. Cl.² B23Q *3/02*

U.S. Cl. 269—94 **15 Claims**



1. A workpiece holder for clamping a workpiece to a work table comprising:

a base secured to said work table,

an elongated clamp member positioned above said base and generally parallel thereto,

a bending arm secured at one end to said base and at its other end to said clamp member at a position intermedi-

ate the longitudinal ends of said clamp member thereby dividing the clamp member into a first and second leg, said bending arm being dimensioned so as to form a slot of predetermined width between said base and said first leg of the clamp member,

a plunger adapted to be axially received in said slot and having means to vary the width of said slot in dependence on the axial position of said plunger so that said second leg of said clamp member moves in a direction for engaging said workpiece, and

means for varying the axial position of said plunger,

wherein said base, said clamp member, and said bending arm are integral with each other.

4,027,868

WELDING JIGS

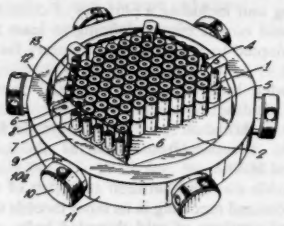
Robert Jolly, Preston, England, assignor to United Kingdom Atomic Energy Authority, Great Britain

Filed Mar. 22, 1976, Ser. No. 668,901

Claims priority, application United Kingdom, Apr. 2, 1975, 13534/75

Int. Cl.² B25B *1/24*

U.S. Cl. 269—266 **5 Claims**



1. A welding jig for cellular grids for use in nuclear reactor fuel element assemblies, the jig comprising

a base plate,

a multiplicity of members which are right cylinders, each stepped intermediately to define opposed end regions of major and minor diameters, the members being upstanding on the base plate on their ends of major diameter and arranged in regular hexagonal array

means for locating the central member of the base plate, the remaining members being free standing on the plate, and

means confining the free standing members in hexagonal array on the base plate with the cylindrical surfaces of major diameter of adjoining members in mutual abutment.

4,027,869

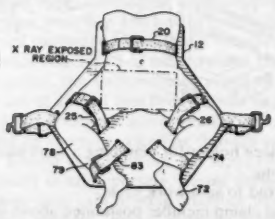
PATIENT RESTRAINT FOR X-RAY STUDIES OF INFANTS

Gilbert G. Ruiz, 2614 N. Sterling Drive, McHenry, Ill. 60050

Filed June 1, 1976, Ser. No. 691,566

Int. Cl.² A61G *13/00*

U.S. Cl. 269—328 **3 Claims**



1. An infant restraint particularly suitable for immobilizing an infant in either supine or frog-leg position during X-ray examination including:

a panel having a vertical midline;

first strap means near the top of said panel for encircling the lower abdomen of the infant;

a first pair of vertical slots laterally spaced apart and equidistant from said midline for receiving said first strap means;

second strap means near the bottom of said panel for encircling both thighs of the infant when said thighs are positioned next to each other;

a second pair of vertical slots laterally spaced apart and equidistant from said midline for receiving said second strap means;

third and fourth strap means respectively located above said second strap means for separately encircling the respective thighs of the infant when in frog-leg position;

a third and a fourth pair of spaced slots for receiving said third and fourth strap means, respectively, said third and fourth pairs of slots being respectively oriented and positioned perpendicular to and laying along one of a pair of upwardly divergent lines crossing said midline at substantially the same juncture point; and

a fifth pair of spaced slots arranged below said third and fourth pairs of slots adjacent said upwardly extending divergent lines and substantially parallel thereto;

for receiving therethrough said second strap means to form ankle-restraining loops when the infant is in frog-leg position.

4,027,870

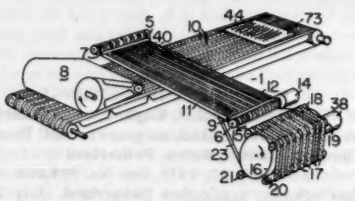
END FOR END DOCUMENT INVERTER

Roger Alvan Frech, Canoga Park, and Martin Moses Bondar, Northridge, both of Calif., assignors to Terminal Data Corporation, Woodland Hills, Calif.

Filed Oct. 4, 1976, Ser. No. 729,047

Int. Cl.² B65H *29/00*

U.S. Cl. 271—65 **10 Claims**



3. A document moving apparatus comprising;

a. first belt means (**10**) to reversibly translate a document,

b. first control means to stop said first belt means for a predetermined interval of time at a first position and thereafter to reverse the direction of motion of said first belt means and to stop the same at a second position,

c. other belt means (**12**) disposed above said first belt means at said second position and oriented to move said document (**44**) at right angles to the previous direction of translation of said document,

d. a drum (**16**),

e. still other belt means (**17**) substantially surrounding and acting to support said drum, to accept said document from said other belt means and to return it inverted to said other belt means,

f. pneumatic means adjacent to and coactive with both said first and said other belt means, to attach said document to either of said belt means and

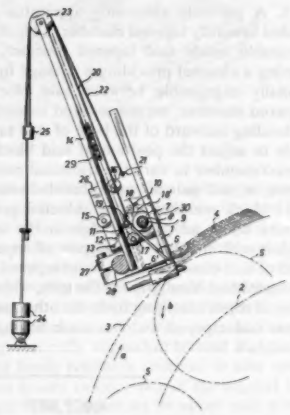
g. other control means (**30,-72**) coactive with said first and said other belt means and with said pneumatic means to sequentially;

1. release said document from said first belt means,
2. attach said document to said other belt means (12) for turning the document over,
3. release said document from said other belt means, and
4. again attach said document to said first belt means in an end-for-end inverted relation with respect to the first attachment of said document to said first belt means.

4,027,871
APPARATUS FOR APPLYING CONTACT PRESSURE TO PACKS OF TUBE SECTIONS

Willy Niemeyer, Natrup-Hagen, and Helmut Simon, Lengerich, both of Germany, assignors to Windmoller & Holscher, Lengerich, Germany

Continuation-in-part of Ser. No. 469,897, May 14, 1974, abandoned. This application May 14, 1975, Ser. No. 577,479
Claims priority, application Germany, May 14, 1973, 2324361
Int. Cl.² B65H *1/06, 3/10*
U.S. Cl. 271—95 **7 Claims**



1. Apparatus for pressing downwardly packs of tube sections deposited and replenished in the stack magazine of a rotary feeder equipped with suction cylinders, comprising in combination:

carriage means arranged for reciprocal movement in said stack magazine and having a rotatable shaft means mounted thereon for pivotally mounting a plurality of pressing fingers having end portions for pressing engagement upon said tube sections and spring means connected to said carriage and said rotatable shaft means for biasing said fingers into a position for said pressing engagement,

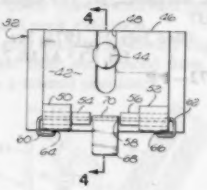
means for lowering said carriage means as the height of the stack of tube sections beneath said carriage decreases to maintain the downward pressing, and

actuating means connected to said rotatable shaft means to pivot said fingers for lateral withdrawal from the stack of tube sections and to move concurrently said carriage means upwardly in said stack magazine when said carriage means reaches a predetermined spacing from the suction cylinders of the rotary feeder thereby placing said fingers in pressing engagement with the uppermost tube section in the replenished stack magazine.

4,027,872
SHEET SEPARATION DEVICE

Robert A. Bueker, Mission Viejo, Calif., assignor to Direct Image Corporation, Monterey Park, Calif.

Filed Jan. 15, 1976, Ser. No. 649,394
Int. Cl.² B65H *3/54*
U.S. Cl. 271—170 **5 Claims**



1. A sheet separation device for use with a stack of sheets held by a support structure for individual sheet removal by a lifting mechanism, comprising:

a bracket member affixed to said support structure and defining spaced-apart, axially aligned passages adjacent to said stack of sheets;

a torsion spring having opposed ends fixed to said bracket member and extending coaxially between said aligned passages;

a pair of tubular spacers mounted in said passages to support said spring coaxially with said aligned passage and extending to substantially enclose said torsion spring on each side of a central length;

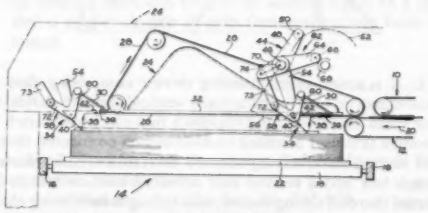
and

tab means affixed to said central length of said torsion spring to provide a flat leaf section in a plane substantially parallel to said sheets, for contacting the stack at one edge thereof.

4,027,873
SHEET HANDLING APPARATUS

Thomas Desmond Bishop, Solihull, England, assignor to The Deritend Engineering Company Limited, Birmingham, England

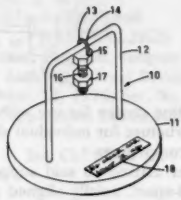
Filed Apr. 29, 1976, Ser. No. 681,446
Claims priority, application United Kingdom, Apr. 30, 1975, 17940/75
Int. Cl.² B65H *29/32*
U.S. Cl. 271—197 **10 Claims**



1. Sheet handling apparatus comprising a conveyor belt drive, a suction chamber extending above a lower run of said belt drive, for drawing a sheet against said lower run to enable the sheet to be conveyed forward by the belt drive, at least one sheet-engaging element movable between a first position above the plane of said lower run and a second position below said plane, and drive means for effecting forward and downward movement of said element from said first to said second position, with a horizontal component of velocity which is momentarily substantially the same as the belt speed, and for effecting return movement of said element to said first position, characterized in that the path of said return movement

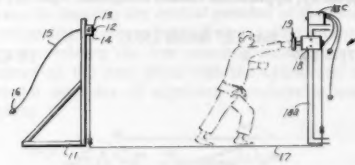
extends from said second position forward and upward to bring said element above the plane of said lower run, and thence extends rearward above said plane to said first position.

4,027,874
NOVELTY ITEM
Theonda N. Buckholtz, Jr., 113 Sigma St., Apt. 2, Belle Chasse, La. 70037
Filed July 23, 1975, Ser. No. 598,212
Int. Cl.² A63B 71/00
U.S. Cl. 272—1 R **4 Claims**



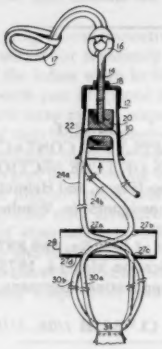
1. A novelty item comprising:
a. base means;
b. stanchion means comprising a U shaped member rigidly affixed in an inverted position to said base means, being oriented essentially perpendicular thereto; and
c. a threaded bolt and nut assembly comprising a conventional threaded bolt member having a U shaped member in turn rigidly affixed to its head portion and adapted to receive and bayonet upon said U shaped upright stanchion member along its mid portion.

4,027,875
RECATION SPEED TRAINING DEVICE
Carson Monroe Hurley, P.O. Box 12783, Roanoke, Va. 24028
Filed Apr. 23, 1975, Ser. No. 570,616
Int. Cl.² A63B 69/00
U.S. Cl. 272—76 **1 Claim**



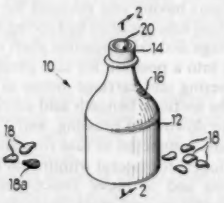
1. A reaction-speed training device comprising first and second spaced apart substantially vertical support stands, said first stand having secured thereto a first electrical switch box having a first user actuated contact switch connected thereto; said second stand having secured thereto a second electrical switch box and a second user actuated contact switch connected thereto; timing means; said timing means being electrically connected to each of said user actuated contact switches such that said timer will be started when said first user actuated contact switch is actuated by a user and will be stopped when said second user actuated contact switch is actuated by the same said user to thereby indicate the time elapse between actuation of said first and second contact switches by said user; said second switch box having an elongated, spring biased substantially horizontally extending plunger mounted thereon, said second contact switch being mounted adjacent one end of said plunger such that said one end will engage said switch when said plunger is moved in the direction thereof, said plunger having mounted on its opposite end an enlarged resilient target pad for striking by a user to move said plunger one end into contact with said second switch.

4,027,876
EXERCISING APPARATUS
Lyman Clarke Johnston, 12 Boulton Drive, Toronto, Ontario, Canada
Filed Apr. 7, 1976, Ser. No. 674,580
Int. Cl.² A63B 21/00
U.S. Cl. 272—133 **10 Claims**



1. A portable exercising apparatus comprising an open ended inwardly tapered member, a block member positionally locatable inside said tapered member, said block member having a channel providing a passage for a pair of ropes frictionally engageable between said block member and said tapered member, means secured to said block member, and extending outward of the base of said tapered member, rotatable to adjust the position of said block member in said tapered member to vary the frictional resistance against movement on said pair of ropes therebetween, means to maintain said block member in the selected position, said rotatable means being adapted for detachable securement to a fixed object with the end of said pair of ropes emerging from one end of said channel and the said tapered member, each having an individual hand grip for the user, with the other ends of said pair of ropes emerging from the other end of said channel and then said tapered member each having individual means to contain a foot of the user.

4,027,877
GAME DEVICE
Jeffrey D. Breslow, Highland Park, and Mitchell J. Frumkin, Chicago, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.
Filed Aug. 13, 1975, Ser. No. 604,262
Int. Cl.² A63B 67/00
U.S. Cl. 273—1 R **1 Claim**



1. A game apparatus, comprising:
a container in the form of a bottle having an interior cavity

and an opening thereto at the top of a reduced neck portion of the bottle;

a plurality of playing pieces smaller than said opening positionable into the interior cavity of said container;

restriction means at said opening permitting the playing pieces to pass thereby out of the container through said opening but inhibiting free movement of the playing pieces so as to require manual manipulation of the container by a player of the game in order to shake a given number of playing pieces out of the container, said restriction means including a plurality of rod-like baffles spaced angularly and longitudinally within said neck portion in a general radial disposition and extending only partially across the neck portion; and

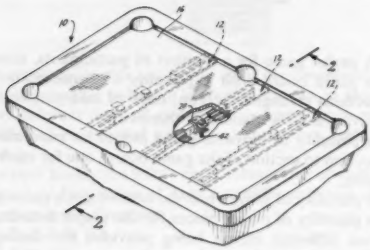
an aperture in the side of said bottle for replacing said playing pieces thereinto.

4,027,878

BED LEVELING MECHANISM

Bemanali H. Dadbeh, Seal Beach, Calif., assignor to Crown Recreation, Inc., Hollis, N.Y.

Filed Sept. 15, 1975, Ser. No. 613,186
Int. Cl.² A63D *15/00*
U.S. Cl. 273—6 **10 Claims**



7. A bed-leveling mechanism for use in table type games having a game board positioned therein, said leveling mechanism comprising an elongated rigid support bar adapted to be mounted on said game below the game board, a bed level slide bracket slidably mounted on said support bar for selective movement to any of a plurality of selected positions along said bar, said bracket having a pair of generally horizontally extending spaced flange members located along one side thereof respectively including vertically aligned apertures therein, a threaded adjusting rod freely rotatably received in said apertures in spaced relation to one exterior side of the support bar and having an enlarged head portion on its upper end; a nut positioned between said flanges in threaded engagement with said rod whereby the nut is held against vertical movement by the flanges and rotation of the nut causes longitudinal movement of the rod; and a bed-level guide plate adapted to be secured to the underside of said game board directly above and in alignment with the path of travel of said adjusting rod along said support bar, said guide plate having a longitudinally extending slot formed therein through which said rod extends, with the enlarged head of the rod received in said channel, whereby rotation of said nut will cause adjacent portions of said game board to be raised or lowered.

4,027,879

TENNIS TRAINING DEVICE

Bruce David Wright, 96 Longhill St., Springfield, Mass. 01108

Filed Apr. 21, 1975, Ser. No. 569,829
Int. Cl.² A63B *69/38*
U.S. Cl. 273—29 A **1 Claim**

1. A tennis training aid comprising the combination of:

a shaft, an elongated hollow resilient grip member having a longitudinal central opening loosely enclosing said shaft,

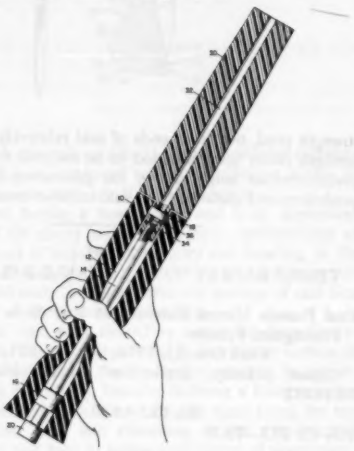
an elongated neck member axially aligned with and normally disposed closely adjacent one end of said grip member,

a neck extension extending outwardly from one end of said neck member and loosely extending into said central opening of the grip member, one end of said shaft fixedly being engaged with said neck extension,

a shaft slide collar fixed within said central opening adjacent the other end of said grip member and encircling said shaft for sliding engagement therewith,

a neck extension slide collar fixed within said central opening and encircling said neck extension,

and a stop knob, said stop knob being fixedly engaged with the other end of said shaft and spaced from said shaft slide collar when in a normal position,



said grip member being deformable to a position of embracement about said shaft when and as a user grips said grip member with proper pressure during simulation of any of the usual stroke motions in a tennis game, said grip member moving away from its position of embracement about said shaft when improper pressure is applied thereto, wherefore said shaft and said neck extension slide relative to their respective collars and said neck member moves from its normal position closely adjacent said end of said grip member to a position wherein it is spaced therefrom to give a visual signal to a user that a proper degree of grip firmness has not been attained, with said stop engaging said shaft collar and emitting a sound on contact therewith to give an audible signal to a user that a proper degree of grip firmness has not been attained.

4,027,880

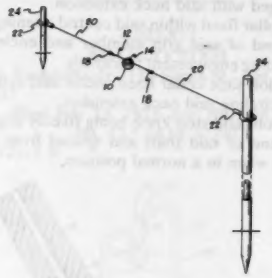
TENNIS TUNER

Frederick B. Hadtke, New Providence, N.J., assignor to Idex Corporation, Scotch Plains, N.J.

Filed Jan. 9, 1976, Ser. No. 647,909
Int. Cl.² A63B *69/38*
U.S. Cl. 273—29 A **9 Claims**

1. A captive tennis ball apparatus for practice purposes comprising: a captive tennis ball; suspending means attached to and suspending said captive tennis ball, comprising at least one relatively inelastic, high strength cord, capable of being stretched repeatedly only to from about 110% to less than about 350% of its original length without breaking or rupturing and without suffering permanent deformation or permanent set; and relatively elastic, lower strength cords, capable of being stretched repeatedly at least to from about 400% to about 750% of their original lengths without breaking or

rupturing or without suffering permenent deformation or permanent set, the ends of said relatively elastic, lower strength cords being attached to the ends of said suspending means comprising at least one relatively inelastic, high



strength cord, the other ends of said relatively elastic, lower strength cords being adapted to be secured to supports at a predetermined height above the ground or floor and at a predetermined distance from said captive tennis ball.

4,027,881

TENNIS RACKET WITH VARIABLE BALANCE AND WEIGHT

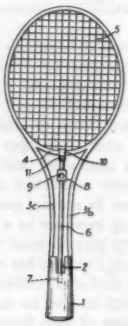
Paul Francis Marcel Hufenus, 16 Rue de la Coste, 34 110 Frontignan, France

Filed Dec. 23, 1974, Ser. No. 537,105

Claims priority, application France, May 13, 1974, 74.16392

Int. Cl.² A63B *49/04*

U.S. Cl. 273—73 R **11 Claims**



11. Tennis racket comprising a frame and a handle attached to said frame, said handle comprising a grip at the end thereof remote from the frame, a single elongated guide member extending between said grip and frame, said guide member having a circular section and being provided with a plurality of longitudinally spaced recesses therein, said recesses completely encircling said guide member, a movable member mounted to slide longitudinally along said guide member in response to pressure exerted on said movable member longitudinally of said guide member, and resiliently biased stop means carried by said movable member and dimensioned to project into any one of said recesses so as to releasably retain said movable member at any one of a plurality of different positions longitudinally spaced along said guide member, said stop means and the recesses in said guide member having cooperating surfaces transverse to said guide member, at least one of which is so sloped that only resilient resistance to sliding movement of said movable member is provided when said stop means projects into one of said recesses.

4,027,882

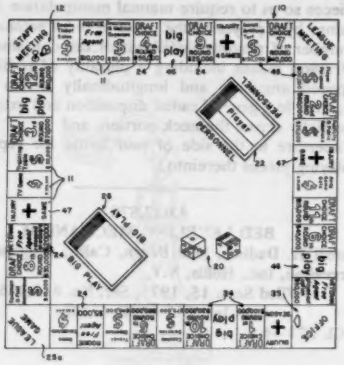
FRANCHISE BOARD GAME

John D. Rosenberg, 200 Highland Ave., State College, Pa. 16801

Filed June 23, 1976, Ser. No. 699,170

Int. Cl.² A63F *3/00*

U.S. Cl. 273—134 AT **10 Claims**



1. A parlor game for a number of participants, comprising

a. a game board with a plurality of consecutive playing sections arranged thereon, each of said playing sections having indicia associated therewith,

b. a plurality of movable game pieces for movement from section to section of the game board, one for each participant,

c. a plurality of player boards, one for each participant,

d. a plurality of player pieces for the player boards, at least two different indicia being provided for distinguishing two distinct types of player pieces,

e. chance means for advancing the movable pieces around the game board from section to section,

f. chance player piece selection means having indicia corresponding to the indicia for distinguishing between the at least two distinct types of player pieces, and

g. selected playing sections on the game board having indicia indicating that the chance player piece selection means may be employed.

4,027,883

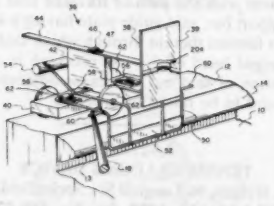
METHOD FOR AIMING A BILLIARDS BANK SHOT

Michael C. Batori, 01710 SW. Riverdale Road, Portland, Oreg. 97219

Filed Sept. 22, 1975, Ser. No. 615,244

Int. Cl.² A63D *15/00*

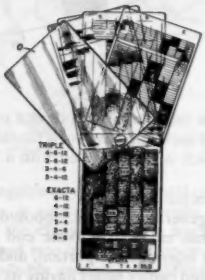
U.S. Cl. 273—14 **10 Claims**



1. A method of aiming a billiards bank shot, whereby a billiard ball on the playing field of a billiard table is bounced off of the face of a cushion of said table toward a target, which comprises positioning a reflective surface at a location adjacent a cushion of said table relative to said billiard ball and target such that said billiard ball is visually alignable along a

straight line with an image of said target reflected from said reflective surface, and visually aligning said billiard ball with said reflected image along said straight line.

4,027,884
BETTING DEVICE
Thomas J. Oakley, 5811 Jarvis Lane, Bethesda, Md. 20014
Filed Mar. 19, 1976, Ser. No. 668,668
Int. Cl.² G09F 9/00
U.S. Cl. 273—148 R 12 Claims



1. A betting device for indicating all of the combinations of numbers 1 through *n* (where *n* is greater than 4), in groups of only two different ones of said numbers each, from at least three different preselected ones of said numbers, said device comprising:

a base card having the following combinations of numbers 1 through *n*, in groups of only two different ones of said numbers each, thereon:

1-2, 1-3, 1-4 to 1-*n*

2-3, 2-4 to 2-*n*

3-4 to 3-*n*

4-*n*

a first overlay sheet which covers all of the groups of numbers on the base card which include the number 1 and exposes all of the groups of numbers on the base card which include only numbers other than 1 when the first sheet overlies the base card;

a second overlay sheet which covers all of the groups of numbers on the base card which include the number 2 and exposes all of the groups of numbers on the base card which include only numbers other than 2 when the second sheet overlies the base card;

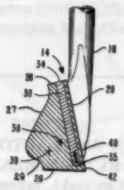
a third overlay sheet which covers all of the groups of numbers on the base card which include the number 3 and exposes all of the groups of numbers on the base card which include only numbers other than 3 when the third sheet overlies the base card;

a fourth overlay sheet which covers all of the groups of numbers on the base card which include the number 4 and exposes all of the groups of numbers on the base card which include only numbers other than 4 when the fourth sheet overlies the base card;

an *n*th overlay sheet which covers all of the groups of numbers on the base card which include the number *n* and exposes all of the groups of numbers on the base card which include only numbers other than *n* when the *n*th sheet overlies the base card whereby when the overlay sheets corresponding to at least three different preselected ones of said numbers are removed from their position overlying the base card, all of the combinations of the preselected numbers, in groups of only two different ones of said numbers each on the base card, are exposed; and

each of said sheets having a character thereon enabling ready association of each associated sheet with the respective number covered by that sheet.

4,027,885
GOLF IRON MANUFACTURE
Kenneth A. Rogers, 13520 Victory Blvd., Van Nuys, Calif. 90401
Division of Ser. No. 476,851, June 6, 1974, Pat. No. 3,970,236.
This application July 19, 1976, Ser. No. 706,648
Int. Cl.² A63B 53/04
U.S. Cl. 273—169 8 Claims



1. A golf club comprising a head of the numbered category iron type having an improved weight distribution below its center of precussion with a ball which comprises:

a head blank having a hosel, neck and body dependent thereof of the shape and size generally characteristic of an iron head of numbered catagory and bearing, in the face of said body, a cavity extending from at least one edge of said body across a substantial portion of said face and below said center of precussion;

a sheet metal face plate extending across the face dimensions of said cavity and mounted flush with the surface of said head and secured thereto by fusion along its periphery to said head body, thereby defining a homogeneous head blank having an interior cavity open along the top edge of said head and extending across a substantial distance of said face to below said center of precussion;

a predetermined amount of high density weighted material in the bottom of said cavity below said center of percussion to impart the desired swing weight to said blank; and

a low density filler filling the remainder of said cavity.

4,027,886
GOLF SWING TIMING DEVICE
Toyonari Katsube, 2-4-3, Takeyama, Midori, Yokohama, Japan
Filed Sept. 19, 1975, Ser. No. 614,977
Int. Cl.² A63B 69/36
U.S. Cl. 273—186 A 3 Claims

1. A device for measuring time of a golf swing comprising:

1. a golf club having a shaft, a clubhead portion and a grip portion;

2. a magnet element fixedly positioned on a part of the golf club shaft adjacent to the grip portion, said magnet ele-

ment being in the form of a tube having replaceable magnetic inserts to vary its magnetic attractive force;

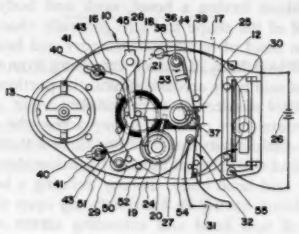
3. a stop unit fixedly mounted on said golf club shaft at a position close to the clubhead, and

4. a movable tube having a metal portion which can be attracted by the magnet element, said movable tube being also fitted on said club shaft intermediate said magnet element and said stop unit and being adapted to move away from said magnet element toward said stop unit in response to centrifugal force created by the golfer's swing so as to collide with said stop unit.

4,027,887
TOY PHONOGRAPH WITH AUTOMATIC PICKUP ARM RETURN MEANS

Katsumi Watanabe, Kawasaki, Japan, assignor to Yugen Kaisha Watanabe Kenkyusho, Japan

Filed May 17, 1976, Ser. No. 686,719
Claims priority, application Japan, Jan. 3, 1976, 51-22030
Int. Cl.² A63H 3/33; G11B 17/06
U.S. Cl. 274—1 A **7 Claims**



1. In a phonograph of the type comprising a turntable rotatable with a record having at least one spiral groove formed therein, a pickup arm pivotally supported at one end and carrying at another end a reproducing stylus movable relatively into and out of engagement with the groove in the record, first spring means which biases the pickup arm toward a predetermined starting position on the record and against the bias of which the pickup arm is movable toward a predetermined terminal position on the record as the stylus follows the groove in the record for receiving mechanical vibrations therefrom during rotation of the turntable, and a diaphragm for converting the vibrations of the stylus into corresponding sound waves, an improved pickup arm return means, comprising:

a. a drive wheel rotatable with said turntable;

b. a driven wheel which is engageable by the drive wheel;

c. carriage means rotatably supporting said driven wheel and adapted to be actuated by said pickup arm when the pickup arm travels from said starting to said terminal position, the carriage means moving said driven wheel into engagement with said drive wheel, said driven wheel being adapted to be rotated by said drive wheel when in engagement therewith;

d. second spring means acting on said carriage means for normally holding said driven wheel out of engagement with said drive wheel;

e. a cam rotatable with said driven wheel;

f. a cam follower actuated by said cam when said pickup arm is in said terminal position for causing said stylus to disengage the groove in the record, and

wherein said pickup arm is permitted to return to said starting position under the bias of said first spring means upon actuation of said cam follower by said cam, said cam being adapted to permit said stylus to re-engage the groove in the record upon return of said pickup arm to said starting position.

4,027,888
VARIABLE CONTOUR SEATING DEVICE

Thomas J. Wilcox, Rte. 1, Box 334, East Troy, Wis. 53120

Filed Jan. 30, 1976, Ser. No. 653,896
Int. Cl.² A47C 7/02
U.S. Cl. 297—284 **7 Claims**

1. A variable contour seating device comprising

an elongated sack-like cover of a flexible material forming a cavity which is loosely filled with a freely flowable filler material,

said cover including

a pair of generally vertical, opposed side panels, each of which has enlarged curvate end portions and a constricted intermediate portion, and

an elongated center panel having its opposed longitudinal sides joined to the perimeter of said side panels so as to provide a longitudinal body supporting upper surface having a generally convex first enlarged end portion adapted to serve as a backrest area, a generally convex second enlarged end portion adapted to serve as a leg rest area, and a generally concave intermediate area adapted to support the derriere of the occupant, the vertical height of said enlarged curvate end portions being greater than the vertical height of said constricted intermediate portions so that the vertical heights of said backrest area and said leg rest area are always greater than the vertical height of said intermediate area,

whereby an occupant lying on said body supporting surface can vary the contour thereof by selectively shifting his weight from one to another of said areas so as to cause said filler material to flow in a longitudinal direction from said intermediate area and decrease the vertical height of said intermediate area when weight is shifted onto said intermediate area, and to flow into said intermediate area and increase the vertical height of said intermediate area when weight is shifted from said intermediate area, and can thereby selectively alter the contour of said areas relative to one another and from and back to the initial shape of said seating device imparted by reason of the construction features recited above.

4,027,889
STAIR-CLIMBING CARRIER

Gary F. Krofchalk, Rochester, and Andrew D. Dodds, Claremount, both of Minn., assignors to Kando Incorporated, Claremont, Minn.

Filed Nov. 10, 1975, Ser. No. 630,093
Int. Cl.² B60P 9/00
U.S. Cl. 280—5.22 **15 Claims**

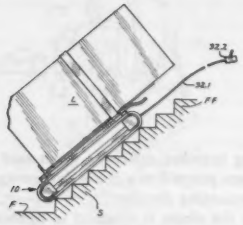
1. A tracked carrier for carrying loads in a tilted position across floors and up and down stairs, and comprising

an elongate load-carrying frame with means to which a load may be attached along the elongate frame, the frame having upper and lower ends,

a spaced pair of elongate, parallel, endless tracks extending along opposite sides of the frame and being movable in elongated paths to drive the frame along a supporting surface and up and down stairs, the tracks extending

beyond the lower end of the frame to support the frame upon such a supporting surface when the frame is tipped to upright and inclined positions;

a lifting arm pivotally mounted at one end to the frame adjacent the lower end thereof, and having a floor-engaging caster at its other end, the lifting arm being configured for reception within the frame between the tracks when swung upwardly into a retracted position with the caster nearer the upper than the lower end of the tracks, and the



arm being swingable to near horizontal position when the elongate frame is supported in upright position on the lower ends of the elongate endless tracks and against a load to be tipped into inclined transport position; and

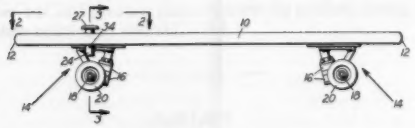
means for controllably swinging the lifting arm outwardly from its retracted position to support the frame in an inclined angle with the floor for travel therealong on the caster wheel and the lower ends of the elongate endless tracks.

4,027,890

SKATEBOARD WITH BRAKE

Adolf Volkmann, 4614 SE. Yamhill St., Portland, Oreg. 97215

Filed Apr. 12, 1976, Ser. No. 676,377
Int. Cl.² A63C 17/14
U.S. Cl. 280—11.2 **6 Claims**



1. A skateboard comprising

a. an elongated rigid body member having forward and rearward ends and also having top and bottom surfaces,

b. wheel truck assemblies on the under side of said body member adjacent each end,

c. each of said truck assemblies having a pair of wheels,

d. a pair of upright brake shoes extending down through said body member in slidable relation adjacent at least one of said pair of wheels,

e. said brake shoes having bottom ends arranged to engage the surfaces of respective wheels upon downward movement of said shoes,

f. a foot engageable cross plate secured to the tops of said brake shoes and arranged to be pushed downwardly by the skateboard operator for moving said shoes down into engagement with the surface of said wheels in a braking function.

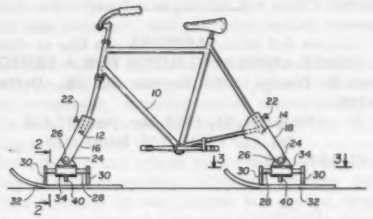
g. and resilient retracting means normally holding said brake shoes and above said wheels in non-braking position.

4,027,891

BICYCLE TYPE SKI APPARATUS

Bruce H. Frame, Wytheville, Va., assignor to The Raymond Lee Organization, Inc., a part interest

Filed Apr. 9, 1976, Ser. No. 675,487
Int. Cl.² B62B 13/04
U.S. Cl. 280—7.14 **4 Claims**



1. A device comprising:

a bicycle frame having front and rear wheels removed whereby the frame has bottom front and bottom rear end points;

first and second elongated downwardly inclined hollow sheaths, each sheath having an enlarged opening at an upper end, each of the end points being disposed removably in the upper end of the corresponding one of the sheaths;

first and second horizontal skis;

first and second brackets, each bracket being secured to the corresponding ski and including a horizontal rod extending longitudinally along the corresponding ski and spaced above its top surface;

first and second parallel horizontal axles extending at right angles to said rods, each axle being secured to and extending through the lower end of the corresponding sheath;

first and second connectors, each connector being pivotally secured to the corresponding one of the axles and rotatably disposed about the corresponding one of said rods; and

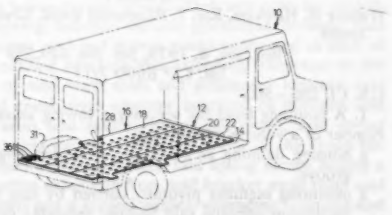
first and second rotation limiting means, each means being secured to the corresponding one of the connectors and extending downwardly towards the top surface of the corresponding one of the skis to limit the rotation of the corresponding connector in either direction about the corresponding rod to a selected arc.

4,027,892

CARGO RESTRAINING ASSEMBLY FOR USE IN A VEHICLE

James R. Parks, 9380 W. Loomis Road, Franklin, Wis. 53132

Filed Oct. 28, 1975, Ser. No. 626,265
Int. Cl.² B60P 7/10
U.S. Cl. 280—179 R **10 Claims**



1. A cargo restraining assembly for use in vehicles for pre-

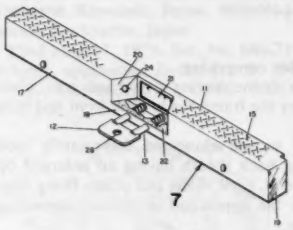
venting shifting of cargo transported in said vehicles, said cargo restraining assembly comprising a platform means receivable on a cargo supporting surface of said vehicle for use in supporting cargo, said platform means having spaced bore therein, peg means receivable in said bores, and supporting plate means for restraining cargo supported by said platform means said supporting plate means being secured in position on said platform means by said peg means.

4,027,893

FORCE ABSORBING HITCH FOR A VEHICLE

Forrest R. Drudge, 1201 Begonia St., SE., DeMotte, Ind. 46310

Filed Oct. 31, 1975, Ser. No. 627,616
Int. Cl.² F16G 7/10; B60D 1/16
U.S. Cl. 280—487 **7 Claims**



1. A force absorbing hitch for a vehicle, said hitch comprising:
- a hitch plate;
- frame means adapted to be connected to a vehicle, said frame means having a pair of spaced wall portions with each of said wall portions having means defining a pair of openings therein;
- plate mounting means connected to said hitch plate and having a pair of rods extending through said openings in said frame means so that said plate mounting means is movable with respect to said frame means in first and second predetermined opposite directions;
- limit means including stop means attached to said rods of said plate mounting means and positioned between said wall portions of said frame means to limit the movement of said plate mounting means in said first and second predetermined directions; and
- biasing means including spring means surrounding each of said rods with said spring means being positioned at both sides of said stop means of said limit means to bias said plate mounting means against movement in said first and second predetermined directions to at least partially absorb forces imposed upon said hitch in said predetermined directions.

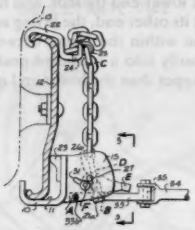
4,027,894

COUPLING HEAD FOR SECURING A VEHICLE TOWING ASSEMBLY

Wallace H. Hawkins, Rte. 7, Buncombe Road, Greenville, S.C. 29609

Filed Nov. 6, 1975, Ser. No. 629,586
Int. Cl.² B60D 1/14
U.S. Cl. 280—502 **3 Claims**

1. A coupling head for securing a towing assembly to the bumper of a vehicle comprising:
- a housing defining an open lower bumper edge receiving groove;
- a mounting member pivotally carried by said housing for oscillation opposite said bumper receiving groove;
- a bumper chain carried for attachment on one end thereof adjacent an upper bumper edge;
- means fastening the other end of said chain to said mounting member;
- means pivoting said mounting member in a direction to tighten said chain; and



- a locking member operable when said mounting member has been pivoted to a chain tightening position to restrain said mounting member;
- whereby the chain is retained in tightened untwisted position until said locking member is released.

4,027,895

CROSS-COUNTRY SKI HAVING ALTERNATE SLIDING AND HOLDING SURFACES

Hans Evald Larsson, Klippvagen 30, 862 00 Kvissleby, Sweden

Filed Dec. 4, 1975, Ser. No. 637,661
Claims priority, application Sweden, Jan. 30, 1975, 7501008
Int. Cl.² A63C 7/00
U.S. Cl. 280—604 **10 Claims**

1. A ski, particularly intended for cross-country skiing, comprising a sliding-surface for cooperating with snow-covered ground or the like,
- a slot extending through said ski in a longitudinal direction of said ski,
- said slot being arranged in a longitudinal central plane of said ski extending in the direction of but not through the ends of said ski,
- said slot dividing the sliding surface of said ski into first and second partial sliding surfaces,
- said first partial sliding-surface being treated to maintain a non-sliding, firm grip against the ground, and
- said second partial sliding-surface being treated to maintain a sliding contact against the ground.

4,027,896
SKI BINDING

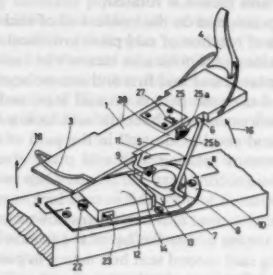
Jean-Paul Frechin, Chamonix, and Francis Vaudaux, Boege, both of France, assignors to Garcia Corporation, Teaneck, N.J.

Filed Mar. 4, 1976, Ser. No. 663,999

Claims priority, application France, Mar. 18, 1975, 75.08392

Int. Cl.² A63C 9/08

U.S. Cl. 280—618 **11 Claims**



1. In a ski binding of the type comprising a mounting plate having means for securing a boot sole thereon, at least one rigid intermediate linkage member pivotally connected at one end to said plate and at another end to the upper face of a ski about parallel axes parallel to said face of the ski, means for pivoting said plate for rotation at least about an axis perpendicular to the plane of said plate, and elastic locking means for holding said plate against upward and rotational movement relative to said ski as long as forces exerted on the plate in at least one direction remain below a limiting value, the improvement wherein said linkage member is directly linked to said plate and is linked to the ski by the intermediary of a piece pivoted on the ski about an axis perpendicular to the upper face of the ski and disposed substantially along the longitudinal axis of the ski, said locking means comprising first elastic locking means carried by one of said ski and said pivoting piece and cooperating with the other of said ski and said pivoting piece to normally prevent rotation of said plate, and second elastic locking means carried by one of said ski and said plate and cooperating with one of said plate, linkage member and said pivoting piece to normally prevent raising of said plate relative to said ski.

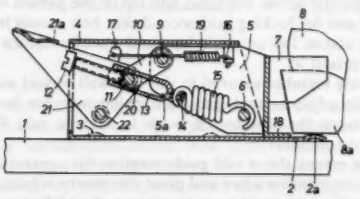
4,027,897
SAFETY SKI BINDING

Kurt Hildebrand, Steingaden 43, Sulzberg, Germany (8961)

Filed Nov. 25, 1975, Ser. No. 635,170

Int. Cl.² A63C 9/08

U.S. Cl. 280—631 **10 Claims**



1. A safety ski binding comprising spring-loaded, releasable holding jaw means for the heel of a ski boot comprising:

a. housing means detachably connected to the surface of a ski comprising parallel vertical side members, and forward and rear axle means disposed transversely between said side members at a lower portion thereof;

b. jaw lever means within said housing means disposed pivotally on said forward axle means and comprising holding jaw means connected to said jaw lever means extending forwardly of said housing means;

c. release bolt means disposed transversely between said side members above said axle means and adapted to be movable and adjustable in parallel slot means contained in said side members, said jaw lever means connected pivotally to said release bolt means by link means;

d. release lever means within said housing means disposed pivotally on said rear axle means and on said release bolt means comprising, actuating means connected to said release lever means and extending rearwardly of said housing means;

e. tension adjusting and release means disposed within said housing means comprising, adjusting member means disposed pivotally on said release bolt means, tension spring means connected between said adjusting member and said forward axle means; and auxiliary tension spring means connected between said jaw lever means and said release lever means.

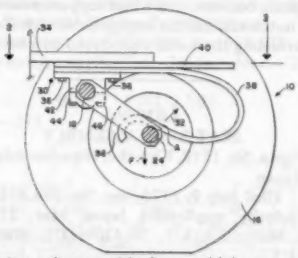
4,027,898
LEVEL LOAD LEAF SPRING DROP AXLE

Buster M. Steen, Seagoville, Tex., assignor to Southwest Wheel and Manufacturing Company, Dallas, Tex.

Filed Apr. 7, 1976, Ser. No. 674,507

Int. Cl.² B60G 11/04

U.S. Cl. 280—720 **5 Claims**



1. In the spring axle assembly for a vehicle comprising:

a pair of spaced bearing brackets,

a main shaft rotatably journaled in said brackets,

a pair of parallel spaced crank arms rigidly fixed to each end of said main shaft on opposite sides of said bearing brackets,

wheel mounting means rigidly fixed to each pair of said crank arms at points remote from said main shaft and extending parallel thereto, a spring follower means extending between each of said crank arm pairs for providing a spring follower surface positioned between said crank arms, and leaf spring means connected to each of said mounting brackets and extending transverse to the length of said main shaft and positioned between said pairs of crank arms whereby interference between said crank arms and said spring is prevented, said spring means being narrower than the width of the space between said crank arm pairs, said spring means having a first portion extending from said bracket away from said main shaft and a second portion extending from the end of said first portion and curved in a direction back toward and parallel to said first portion, and a third hooked portion coupled to the end of said second portion.

4,027,899

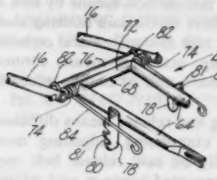
MOTORCYCLE TRAILER

Edward L. Hawes, 405 E. Goulson, Hazel Park, Mich. 48030; Allen R. Hawes, 453 E. Marshall, Ferndale, Mich. 48220, and Edward C. Hawes, 3234 Otis, Warren, Mich. 48091

Division of Ser. No. 360,635, May 16, 1973, Pat. No. 3,937,489. This application July 28, 1975, Ser. No. 599,685

Int. Cl.² B60G *11/20*

U.S. Cl. 280—722 **3 Claims**



1. A vehicle having a frame, a U-shaped wheel support structure comprising a swing arm and a wheel support member extending from each end of said swing arm, a road wheel rotatably mounted between said wheel support members, said swing arm being pivotally mounted to said frame for pivotal movement of said wheel support structure about a horizontal axis, a torsion spring member wrapped around said swing arm and having one end attached to a bar extending transversely across and attached to said frame and means for adjustably attaching the other end to said wheel support structure whereby the force exerted by said torsion spring with respect to said frame and said wheel support structure can be changed by manipulating said adjustable attaching means, said adjustably attaching means comprising a bracket attached to one of said wheel support members, said bracket having a plurality of vertically spaced notches provided therein, the end of said spring being insertable in any one of said notches to thereby affix said spring between said wheel support structure and said frame, the notch selected for engagement with the end of said spring determining the torsion produced by said spring.

4,027,900

SEAT BELT ASSEMBLY

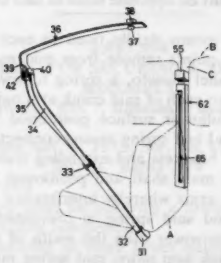
Harutoshi Igeta, No. 1518, Kire-cho, Higashisumiyoshi, Osaka, Osaka, Japan

Filed July 9, 1975, Ser. No. 594,432

Claims priority, application Japan, Mar. 27, 1975, 50-42695[U]; Mar. 27, 1975, 50-42696[U]; Mar. 27, 1975, 50-42697[U]

Int. Cl.² B60R *21/10*

U.S. Cl. 280—745 **7 Claims**



1. A seat belt assembly for an automobile seat comprising:

pivot arm means pivotably mounted to the roof of said automobile above the side of said seat for pivotably rotating in a horizontal plane thereabove;

first said belt means attached to the free end of said pivot arm means for fitting across the torso of a person seated on said automobile seat;

second seat belt means removably attached to the free end of said pivot arm means for fitting across the lap of a person seated on said automobile seat;

belt retracting means operatively connected to the free ends of said first and second belt means opposite the ends thereof connected to said pivot arm means and positioned at the lower side of said automobile seat below said pivot arm means for extending said first and second seat belt means to fit across the person seated on said seat when said pivot arm means is rotated;

lock means positioned on the inside wall of said automobile in the path of rotation of said pivot arm means for engaging and locking said pivot arm means when said pivot arm means is rotated and said first and second seat belt means are crossed over the person on said seat; and

transfer means positioned beneath said lock means on the inside of said automobile wall in the path of said second seat belt means rotating with said pivot arm means for engaging said second seat belt means when said pivot arm means is rotated and locked in said lock means and for lowering said second seat belt means downward from said pivot arm means across the lap of the person on said seat and locking said second seat belt means in position across the person's lap.

6. A seat belt assembly for an automobile seat comprising:

pivot arm means pivotably mounted to the roof of said automobile above the side of said seat for pivotably rotating in a horizontal plane thereabove, said pivot arm means being comprised of:

a hollow pivot arm pivotably mounted to the roof of said automobile,

a flexible lever member slidably fitted within said pivot arm, said lever member having a longitudinal groove therein,

a first mounting block slidably mounted in said groove in said lever member, and

a second mounting block fixedly mounted in said groove in said lever member beneath said first mounting block, said second mounting block being narrower than said first mounting block;

first seat belt means attached to said first mounting block of said pivot arm means for fitting across the torso of a person seated on said automobile seat;

second seat belt means attached to said second mounting block of said pivot arm means for fitting across the lap of a person seated on said automobile seat;

belt retracting means operatively connected to the free ends of said first and second seat belt means opposite the ends thereof connected to said mounting blocks and positioned at the lower side of said automobile seat below said pivot arm means for extending said first and second seat belt means to fit across the person seated on said seat when said pivot arm means is rotated; and

transfer means on the inside of said automobile wall adjacent said seat and beneath said pivot arm means for contacting said flexible lever member and moving said lever member and said first and second seat belt means downward across the torso and lap of the person on said seat and for locking said second seat belt means in position across the person's lap, said transfer means being comprised of:

a guide member secured to the side wall of said automobile adjacent said seat, said guide member having a groove therein large enough to receive said flexible lever member,

drive means above said guide member for contacting said lever member when said pivot arm means is rotated and for lowering said lever member and said first and second mounting blocks into said groove in said guide member,

said guide member further having stopper means projecting therefrom for stopping the downward movement of

said first mounting block in said groove in said guide member while allowing said narrower second mounting block to pass thereby, and

locking means at the bottom of said groove in said guide member for locking said flexible lever member with said second belt means attached thereto.

7. A seat belt assembly for an automobile seat comprising:

pivot arm means pivotably mounted to the roof of said automobile above the side of said seat for pivotably rotating in a horizontal plane thereabove, said pivot arm means being comprised of:

a spring mounted pivot arm mounted to the roof of said automobile above the side of said seat,

spring loaded telescopic member means rotatably mounted to the end of said pivot arm means and extending downward therefrom for telescopically extending downward from said pivot arm, and

a metal piece attached to the bottom of said telescopic member means and extending downward therefrom;

first seat belt means attached to said pivot arm means above said telescopic member means for fitting across the torso of a person seated on said automobile seat;

second seat belt means attached to said telescopic member means for fitting across the lap of a person on said automobile seat;

belt retracting means operatively connected to the ends of said first and second seat belt means and said telescopic member means, said seat belt retracting means being positioned at the lower side of said automobile seat below said pivot arm means for extending said first and second seat belt means to fit across the person seated on said seat when said pivot arm means is rotated and said telescopic member means is extended;

first lock means positioned on the inside wall of said automobile on the path of rotation of said pivot arm means for engaging and locking said pivot arm means when said pivot arm means is rotated and said first and second seat belt means are crossed over the person on said seat; and

second lock means positioned on the inside wall of said automobile beneath said first lock means for receiving and locking therein the metal plate attached to the bottom of said telescopic member when said pivot arm means is locked in said first lock means and said telescopic member is forced downward into said second lock means.

4,027,901

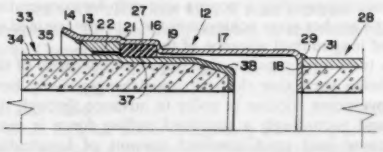
ASBESTOS-CEMENT PIPE FITTING AND METHOD FOR MAKING IT

Jay S. Forni, 1101 Lema, Danville, Calif. 94526

Filed May 24, 1976, Ser. No. 689,340

Int. Cl.² F16L *9/08*

U.S. Cl. 285—55 **9 Claims**



1. A fitting for cylindrical pipe, such as asbestos-cement pipe, for use in connecting a pair of pipe sections such as generally cylindrically-ended iron pipe sections interiorly lined with cement, comprising:

a generally cylindrical sheet metal sleeve having

one generally cylindrical spin-formed end portion, means connecting said end portion to a first of the two iron pipe sections, said end portion extending axially outwardly therefrom toward the second pipe section, said cylindrical end portion having an inside diameter slightly larger than the outside diameter of the end of the second pipe section;

a directly succeeding gasket-engaging spin-formed portion of larger diameter than said cylindrical spin-formed portion, said larger diameter portion meeting the one cylindrical end portion at a gasket-stop shoulder, a slightly still larger diameter portion directly succeeding the gasket-engaging portion, with a smaller shoulder formed between the latter two portions;

said two spin-formed portions having greatly increased tensile strength relative to said still larger diameter portion and resistance to change from true roundness by the heat of welding; and

an annular bar fitted within said slightly larger-diameter portion and means affixing said bar therewithin, said bar having an inside diameter slightly larger than the outside diameter of the second pipe section and having an abutment face seated against said smaller shoulder,

said bar defining an annular seat for an elastomeric gasket ring on said gasket-engaging portion between its said abutment face and said gasket-stop shoulder,

whereby the second pipe section may be assembled into the end of the fitting with an elastomeric gasket ring positioned in the annular seat and compressed between said gasket-engaging portion and the outside surface of the second pipe section.

4,027,902

JOINT FOR CULVERT SECTIONS AND THE LIKE

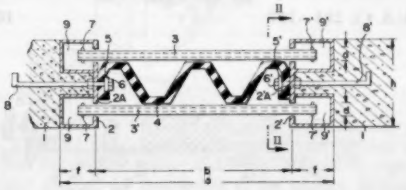
Takayoshi Tanikawa, Zentsuji, Japan, assignor to Seibu Polymer Kasei Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 23, 1976, Ser. No. 669,527

Claims priority, application Japan, Mar. 27, 1975, 50-37338

Int. Cl.² F16L *27/02*

U.S. Cl. 285—114 **8 Claims**



1. Joint for connecting culvert sections and the like comprising

a. a short tubular flexible member of elastic material each end of which is adapted to be attached to one of the adjacent ends of two aligned culvert sections;

b. a plurality of rigid, substantially parallel, closely spaced strengthening members extending between the adjacent ends of said culvert sections both inside and outside of said flexible member to form protective cages around and within said tubular member which substantially inhibit the application of transverse pressure to said tubular member; and

c. means for loosely connecting the ends of said strengthening members to the adjacent ends of said culverts so that said strengthening members can swing to permit relative lateral displacement of said culvert sections.

4,027,903

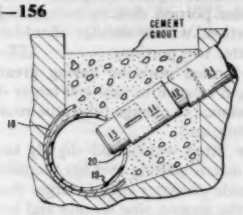
WATER-DEGRADABLE COUPLING MEMBER

Finn Hannover, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 6, 1975, Ser. No. 547,468

Int. Cl.² F16L *41/00*

U.S. Cl. 285—156 6 Claims



1. A lateral connection between an end of a branch pipe and a wall of a main pipe comprising:

a branch pipe

a main pipe spaced apart from the branch pipe, having a diameter greater than the diameter of the branch pipe, and having an opening in the wall aligned with the end of the branch pipe

a tubular body member disposed between the end of the branch pipe and the opening in the main pipe

a first tubular coupling member of water-degradable material disposed within one end of said tubular body member and extending outwardly therefrom, in substantially coaxial relation therewith, into the end of the branch pipe

a second tubular coupling member of water-degradable material disposed within the other end of said tubular body member and extending outwardly therefrom, in substantially coaxial relation therewith, into the opening in the main pipe.

4,027,904

DEVICE FOR A TENSILE LOCKING OF PIPE ELEMENTS

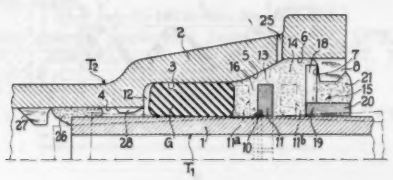
Georges Eugéne Bram, Pont-a-Mousson, France, assignor to Pont-A-Mousson S.A., Nancy, France

Filed Jan. 29, 1976, Ser. No. 653,567

Claims priority, application France, Mar. 14, 1975, 75.07989

Int. Cl.² F16L *21/08*

U.S. Cl. 285—297 10 Claims



1. In a device for the tensile locking of a coupling between a first pipe element having a male end portion and a second pipe element having a socket portion, the male end portion being in an inserted position in the socket portion with interposition of an elastic sealing element, the device comprising an outer abutment projection integral with the male end portion, an inner flange integral with the socket portion and defining an inner shoulder facing axially inwardly of the socket portion and axially spaced from the abutment projection, the socket portion and flange defining with the male end portion a clearance exceeding a clearance for ease of axial assembly so that the pipe elements are able to be assembled at a given angular offset from axial alignment of the pipe elements, a ring located axially between the abutment projection and the flange and axially bearing against the abutment projection and a mass of hardenable material which is in the hardened state and disposed in the whole of a space which is empty between the male end portion and the socket portion and around the abutment projection and the ring, the elastic sealing element being located axially inwardly of the mass of hardenable material and the hardenable material being capable in its hardened state of rigidly resisting extraction of the male end portion from the socket portion; the improvement comprising in combination with the hardenable material and the flange an intermediate tensile locking means axially interposed between the hardenable material and the inner shoulder of the flange and radially overlapping the shoulder and radially extending to the male end portion, the intermediate means radially defining with the socket portion and with the flange sufficient annular clearance to allow said angular offset upon assembly of the two pipe elements.

4,027,905

SEAT BELT SYSTEM FOR VEHICLE

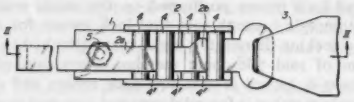
Toshiaki Shimogawa, Nishio; Masayuki Morita, Tokoname, and Takashi Kawaharazaki, Ichinomiya, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Sept. 12, 1975, Ser. No. 613,018

Claims priority, application Japan, Sept. 16, 1974, 49-111053[U]

Int. Cl.² B60R *21/10*

U.S. Cl. 280—746 5 Claims



1. A vehicle seat belt system, comprising:

a seat belt for restraining an occupant;

a seat belt anchor firmly secured to a vehicle body, said anchor having means providing a series of transversally extending, longitudinally spaced members having respective gaps between adjacent members in the series; and

a variable effect shock absorber comprising a strip of metal woven through said gaps, said strip having a head end secured to one end of the seat belt downstream from said gaps and a tail end protruding upstream of said gaps; means providing a stop on said strip for cooperating with the anchor upon achievement of a predetermined amount of longitudinal advance of the strip;

the transverse cross-sectional area and stiffness of the strip being such that the strip must progressively bend and overcome friction in order to advance through the gaps and accordingly a sustained pulling force is needed to cause said predetermined amount of longitudinal advance;

the cross-sectional area of the strip decreasing from a larger value nearer the head end to a smaller value nearer the tail end, in a manner such that as the strip is pulled to longitudinally advance the strip said predetermined amount, at first the resistance offered to strip advancement is larger and then, as the smaller value transverse cross-sectional area traverses the gaps, the resistance offered to strip advancement decreases, in order to first provide maximum restraint during the initial part of a vehicle accident and to then provide some relaxation.

4,027,906

KNEE PROTECTOR

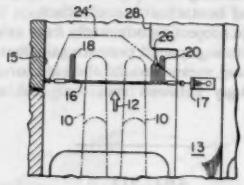
Hideoki Matsuoka, No. 143, Kanazawa-cho, Kanazawa, Yokohama, and Hiroshi Tsuda, No. 3-5-20, Nakahara, Isogo, Yokohama, both of Japan

Filed June 4, 1975, Ser. No. 583,916

Claims priority, application Japan, June 8, 1974, 49-66545[U]; June 15, 1974, 49-70030[U]

Int. Cl.² B60R *21/00*

U.S. Cl. 280—751 **9 Claims**



1. In a motor vehicle having a seat, a knee protector comprising, in combination:

A. an elongated belt having one end fixed to a first portion of said vehicle disposed forwardly of said seat;

B. a device fixed to a second portion of said vehicle disposed forwardly of said seat and spaced laterally, with respect to the longitudinal direction of the vehicle, from said first portion of said vehicle, said device anchoring the other end of said elongated belt to apply a predetermined tension to said elongated belt;

C. a zone, on said elongated belt, which is adapted to receive an impact force by knees of an occupant of said seat during frontal collision of the vehicle, said elongated belt being provided with two longitudinally extensible folds, each said fold having superposed layers which are interconnected by breakable stitches, said two longitudinally extensible folds being disposed on the longitudinally opposite sides of said zone; and

D. a lateral movement control means for directing said zone laterally during said frontal collision, comprising at least one second longitudinally extensible fold having superposed layers which are interconnected by stitches which are more easily breakable than those interconnecting said superposed layers of each said two first longitudinally extensible folds, said at least one second longitudinally extensible fold being disposed on one of said longitudinally opposite sides from said zone that is nearer to an obstacle attached to said vehicle and disposed forwardly of said elongated belt.

4,027,907

SECURITY CHAIN LOCK FOR DOORS

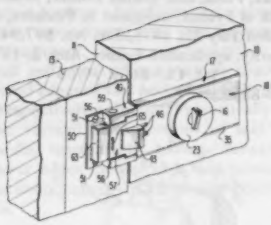
Alois Crepinsek, El Paso, Tex., assignor to International Top Security Corporation, El Paso, Tex.

Filed Apr. 8, 1976, Ser. No. 675,215

Int. Cl.² E05C *17/06*, *17/36*

U.S. Cl. 292—264 **12 Claims**

1. A chain lock for doors comprising a housing secured to the interior side of a door near the free-swinging edge thereof, an extensible and retractable chain and chain latch means within the housing and adapted to be extended beyond one end of the housing, a latch keeper assembly mountable upon a door frame adjacent to said one end of the housing and adapted to lockingly engage with said chain and chain latch means when the latter is extended beyond said one end of the housing, said latch keeper assembly including a manual release element accessible from the interior side of a door when such door is closed, and means anchoring said housing to a lock cylinder housing means of a door, said last-named means including an oblong opening formed through said housing laterally, and a threaded clamping rosette engaging the interior side of the housing and adapted for threaded engagement



with a threaded coupling member of a door lock cylinder housing means.

4,027,908

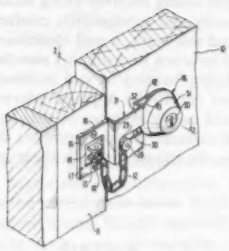
SAFETY CHAIN LOCK FOR DOORS

Alois Crepinsek, El Paso, Tex., assignor to International Top Security Corporation, El Paso, Tex.

Filed July 25, 1975, Ser. No. 599,093

Int. Cl.² E05C *17/36*

U.S. Cl. 292—264 **4 Claims**



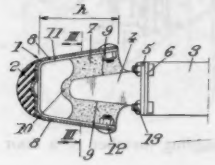
1. A safety chain lock for doors comprising a flexible safety element, a first anchor carried by one end of said element, a first retainer for the first anchor and being substantially right angular and adapted for attachment to the interior vertical edge of a door frame, a second anchor for the opposite end of said flexible safety element, and a second retainer for said second anchor adapted to engage the second anchor releasably, the second retainer having substantially right angular portions adapted to extend about the interior vertical edge of a door and to be attached thereto, and a plate extension on said second retainer adapted to lie on the interior face of a door and to be immovably anchored to an adjacent door lock assembly, said flexible safety element comprising a length of chain, said first anchor coupled to one end link of said chain, said second anchor coupled to the opposite end chain link and having a shank, said second retainer having a slot receiving said shank lockingly and separably, said slot being substantially horizontal and being formed in a wall portion of the second retainer which is offset inwardly from a door on which the chain lock is mounted, a short right angular connecting web on the second retainer extending between said offset wall portion and said plate extension, and one end of said slot opening through said short right angular connecting web.

4,027,909

RESILIENT MOUNTING FOR VEHICLE BUMPER BAR

Pierre Hauraux, Paris, and Michel Domer, Montigny-les-Cormeilles, both of France, assignors to Paulstra, France

Filed July 21, 1975, Ser. No. 597,947
Claims priority, application France, Aug. 2, 1974, 74.26970
Int. Cl.² B60R *19/06*
U.S. Cl. 293—88 **7 Claims**



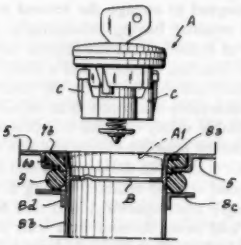
1. In a vehicle comprising an energy-absorbing means employing a resilient elastomeric cushion means disposed between the vehicle bumper and the vehicle frame, the improvement wherein said energy-absorbing means comprises a rigid casing member, of generally U-shaped configuration as viewed in transverse cross-section perpendicular to the bumper, affixed to, but formed separate from, one of said bumper and said frame and defining a cavity, the side walls of said casing member forming said U-shaped configuration being inclined outwardly; the side walls of said casing member, in cross-section, forming a small acute angle with a line parallel to the longitudinal axis of said casing member, and a support member which partially projects into the cavity defined by said casing member, said support member being affixed at one end thereof to the other one of said bumper and said frame, and the surfaces of said support member which oppose said side walls of said casing member being inclined in a direction toward said cavity and substantially conforming in shape to the shape of said side walls, a said elastomeric cushion means being disposed between said support member and said casing member and being bonded to said inclined surfaces of said support member and to the opposed internal surfaces of said side walls of said casing member so that by virtue of the opposed inclined surfaces of said members the energy-absorption means absorbs stresses in both shear and compression.

4,027,910

TERMINAL FOR THE FUEL FILLING PIPE OF A MOTOR VEHICLE

Mario Farelli, C. so Giulio Cesare 298, Turin, Italy

Filed Oct. 15, 1975, Ser. No. 622,563
Claims priority, application Italy, Oct. 18, 1974, 70109/74
Int. Cl.² B60P *3/22;* **B65D** *39/00*
U.S. Cl. 296—1 C **8 Claims**



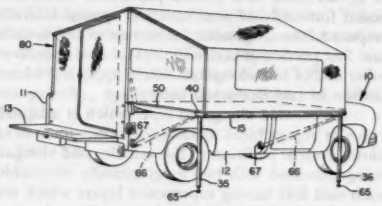
1. An automobile fuel filler pipe assembly comprising:
a. an automobile body portion having a recessed opening surrounded by an inwardly-projecting seat recessed beneath the outer surface of the body portion,
b. a filler pipe having a terminal portion within said opening,
c. a first outwardly projecting flange at the end of said pipe, said flange being spaced above said seat in the body portion,
d. a resilient gasket having portions between:
I. the outer edge of said first flange and said automobile body portion,
II. said first flange and said seat, and
III. the inner edge of said seat and said filler pipe, said gasket maintaining said pipe and body portion completely out of contact with each other,
e. a second flange projecting outwardly from said pipe, said second flange being spaced beneath said seat, and
f. resilient retaining means around the exterior of said pipe and fitted snugly between said seat and said second flange.

4,027,911

SLEEPER/CAMPER ATTACHMENT

George Verne Johnson, 5510 SW. Buddington, Portland, Oreg. 97219

Filed Dec. 8, 1975, Ser. No. 638,653
Int. Cl.² B60P *3/34*
U.S. Cl. 296—23 H **10 Claims**



1. A sleeper/camper attachment for a pickup truck and the like having upstanding sidewalls, comprising a cover having a hinge on one side edge connected to the upper edge of one of said sidewalls, an arm rigidly mounted on the under side of said cover adjacent said hinge, means connected with said arm for opening said cover and for closing the opposite side edge of said cover on the upper edge of the other sidewall, a leg having a pivotal mounting adjacent said opposite side edge of said cover for supporting the cover in a horizontal open position, and latch means on said leg engaging said other sidewall to latch said cover in closed position, said opening and closing means comprising a windlass on said other sidewall having a cable with one end connected to said arm, said windlass comprising a hand crank, and means for detachably connecting the opposite end of said cable with said crank for winding in and paying out said cable.

4,027,912

COLLAPSIBLE ROOF-TOP CAMPER

Egmar A. Pacca, 6012 Dudman Ave., Garden Grove, Calif. 92645

Filed May 3, 1976, Ser. No. 682,777
Int. Cl.² B60P *3/34*
U.S. Cl. 296—23 MC **10 Claims**

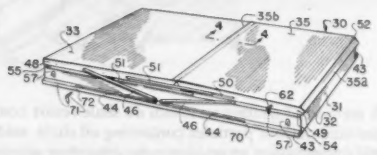
1. A collapsible, roof-top camping structure, comprising:
a body assembly having a floor panel and four vertical panels, each vertical panel being connected to said floor panel along an edge thereof and extending above said floor panel to define a box-like structure having an open top;
a pair of elongated guide-tubes each connected to a first opposing pair of said vertical panels, the longitudinal axis of each such tube being substantially parallel to said floor

panel, each such tube having a slotted opening along at least a portion of its length;

a pair of end-wall panels each pivotally connected to a second opposing pair of said vertical panels, each said end-wall panel having a pair of flange means laterally extending toward the opposing end-wall panel;

a plurality of connector rod means, each rod means being rotatably connected at a first end to said flange means carried by one of said end-wall panels and rotatably connected at a second end to a cylinder means whereby each said cylinder means is slideable longitudinally within said guide-tube;

a pair of roof panels, one such roof panel pivotally connected to each said end-wall panel, said roof panel having a pair of flange means laterally extending towards the interior of said box-like structure, and each such flange means having a slotted opening, said roof panels being



adapted to rest against one another along their respective leading edges;

a plurality of connecting arms each such arm being rotatably connected at a first end to a flange means carried by an end-wall panel and being slideably connected at a second end within the slotted opening of an adjacent flange means of a roof panel;

a pair of side-wall panels pivotally connected to said first opposing pair of vertical panels, said sidewall panels each being adapted to conform to the openings defined by the flange means of said end-wall panels and the flange means of said roof panels when the leading edges of the roof panels rest against one another;

at least one of said pivotally connected panels having a means for providing access to the interior of said camping structure; and

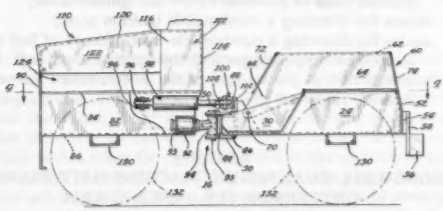
means for detachably mounting said body assembly to the roof of a vehicle.

4,027,913

FRAME STRUCTURE FOR ARTICULATED VEHICLE

Steve A. Youngers, Clearwater, and Terry D. Erickson, Wichita, both of Kans., assignors to J. I. Case Company, Racine, Wis.

Filed Dec. 8, 1975, Ser. No. 638,944
Int. Cl.² B62D *23/00*
U.S. Cl. 296—28 J **7 Claims**



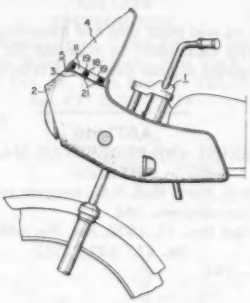
1. In an articulated vehicle having a forward frame section and a rear frame section with a pivotal connection between said sections accommodating relative pivotal movement of said sections about a vertical pivot axis, said rear frame section including first and second transversely spaced fenders, each of said fenders having a forward portion and a rear portion, each of said rear portions including a vertical plate portion and a horizontal plate portion integral with an upper edge of said vertical plate portion and extending outwardly therefrom, brace means respectively interconnecting said forward and rear portions of said first and second fenders, and a cover member cooperating with said fenders to define an enclosed compartment, said cover member including a top horizontal wall and a pair of transversely spaced depending walls on opposed edges of said horizontal wall, said dependent walls being respectively substantially vertically aligned with the respective vertical plate portions of said fenders, said depending walls respectively having outwardly directed flanges on lower edges thereof with said outwardly directed flanges respectively supported on the respective horizontal plate portions.

4,027,914

FITTING DEVICE FOR WINDSHIELD

Takenori Yamamoto; Tsuneo Tsukisaka, and Takeshi Tsukahara, all of Kawagoe, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 26, 1976, Ser. No. 652,294
Claims priority, application Japan, Jan. 29, 1975, 50-11422
Int. Cl.² B62J *17/02*
U.S. Cl. 296—78.1 **8 Claims**



1. A fitting device for a wind shield on a motor-cycle, and the like, which comprises in combination: a body of the motor-cycle; a wind shield plate to be fixed to the motor-cycle body; a fairing means fixedly secured at one portion of the motor-cycle body in a surrounding manner with a curvature; means for fixing said wind shield plate to said fairing means, and which is prone to break or deform when an excessive impact force acts thereon; and means for retaining said wind shield plate in a connected state to said fairing means so as to prevent said wind shield plate from flying and hitting a cycle rider, when an excessive impact force acts on said wind shield plate from the forwarding direction of the motor-cycle and said wind shield plate fixing means becomes broken or deformed.

4,027,915

SUN SHIELD ASSEMBLY FOR DETACHABLE ATTACHMENT TO INFANT'S SEAT

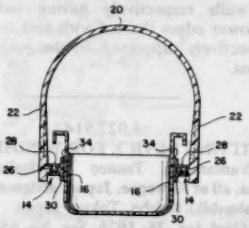
Donald Anderson, and Kaye Anderson, both of 17091 Regulus, Yorba Linda, Calif. 92686

Filed May 7, 1976, Ser. No. 684,103
Int. Cl.² A47C *7/00*
U.S. Cl. 297—184 **4 Claims**

1. A sun shield assembly for detachable attachment to a selected location on an infant's seat comprising in combination:

a pair of mounting brackets each having a base portion and a hollow cylindrical boss projecting from one face of said base portion, an adhesive material being provided on the opposed face of said base portion for releasably securing the bracket to a selected region on the outer side wall of an infant's seat;

a hood having a top wall and opposed side walls, a pivot pin integral with each of said side walls and projecting laterally therefrom inwardly and having a configuration complementary to that of the corresponding boss of the



mounting bracket and dimensioned to be accommodated rotatably within said bosses, said hood being sufficiently resilient to permit separation of the side walls thereof to a spaced apart distance enabling positioning of said pivot pins within the corresponding bosses of the mounting brackets;

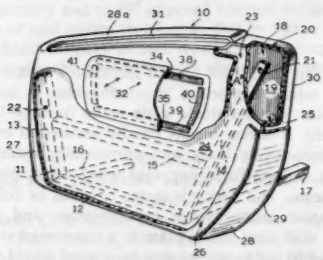
and means on said pivot pins and mounting brackets cooperable with each other to maintain the sun shield in a predetermined angular disposition relative to the infant's seat.

4,027,916

SEAT ARMREST AND PROCESS OF MANUFACTURE THEREOF

Bennitt McElroy, Rural Hall, N.C., assignor to Fairchild Industries Inc., Germantown, Md.

Filed Dec. 15, 1975, Ser. No. 640,917
Int. Cl.² A47C 7/62
U.S. Cl. 297—194 **8 Claims**



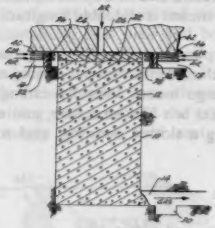
1. An armrest for a seat comprising a first shell, said first shell comprising a central substantially flat portion with a flange extending outward therefrom, a second shell, said second shell comprising a central substantially flat portion with a flange extending outward therefrom, the flanges of said first and said second shells being formed so that the flange of one shell fits into the flange of the other shell, the flanges of said first and said second shells being interconnected with the flange of one shell fitting into the flange of the other shell to form a combined unit comprising said first and second shells, and a third shell member, said third shell member having a central substantially flat portion with a flange extending outward therefrom, the flange of said third shell being formed to be slidable over the unit formed by said first and said second shells, the flange of said third shell being connected to the combined unit formed by said first and second shells after the flange of said third shell has been slid over the unit formed by said first and said second shells.

4,027,917

METHOD FOR IGNITING THE TOP SURFACE OF OIL SHALE IN AN IN SITU RETORT

William J. Bartel, and Robert S. Burton, III, both of Grand Junction, Colo., assignors to Occidental Petroleum Corporation, Los Angeles, Calif.

Filed May 16, 1975, Ser. No. 578,203
Int. Cl.² E21B 43/24, 43/26
U.S. Cl. 299—2 **18 Claims**



1. A method of igniting an in situ oil shale retort containing a fragmented mass of particles containing oil shale, said in situ oil shale retort having an ignition zone extending across the in situ retort and a sufficient void volume distributed through the fragmented mass below the ignition zone for introducing inlet gas into the ignition zone and moving the gas through the fragmented mass below the ignition zone toward the bottom of the in situ retort, and further wherein, the ignition zone contains a portion of the fragmented mass of particles having sufficient average void volume for movement of a volume of inlet gas through a volume of the portion of fragmented mass in the ignition zone with less pressure loss than for the movement of a comparable volume of gas through a comparable volume of fragmented mass below the ignition zone, which comprises the steps of:

directing a sufficient quantity of an ignited combustible mixture of fuel and an oxygen supplying gas horizontally into said ignition zone for producing a self-sustaining combustion zone across the in situ oil shale retort in the fragmented mass below the ignition zone and generating flue gas in the combustion zone; and

causing the flue gases generated in said combustion zone to move from the combustion zone toward the bottom of the in situ oil shale retort for establishing a retorting zone on the advancing side of the combustion zone.

18. An in situ oil shale retort in a subterranean formation containing oil shale comprising:

a fragmented mass of formation particles in such retort;

an ignition zone extending across the top of the fragmented mass of particles in the in situ retort with an average void volume higher than the average void volume of the fragmented mass of particles below the ignition zone;

means for directing a combustible ignition zone;

means for directing a combustible inlet mixture of fuel and an oxygen supplying gas into the ignition zone; and

access means at the bottom of the in situ retort for withdrawing retort off gases and liquids.

4,027,918

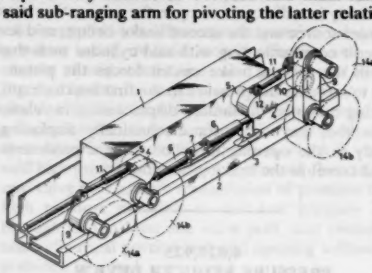
LONGWALL COAL MINING MACHINE WITH PLURAL CUTTERS ON SUB-RANGING ARM

Masao Hujimori; Shigeo Nakajima; Ken Takahashi, all of Tokyo; Tsunetoshi Ito; Toshio Shimada, both of Yokohama, and Hajime Endo, Kushiro, all of Japan, assignors to Taiheiyo Engineering Incorporated, Tokyo, Japan

Filed Feb. 26, 1976, Ser. No. 661,578
Claims priority, application Japan, June 30, 1975, 50-80614
Int. Cl.² E21C 27/24
U.S. Cl. 299—53 **8 Claims**

1. A coal mining machine for use in a pit having a long-

walled pit face comprising a shearer body, a main ranging arm having one end portion thereof pivotally mounted on said shearer body, a ranging jack operatively connected between said shearer body and said main ranging arm for pivoting the latter relative to said shearer body, a sub-ranging arm having an intermediate portion and two end portions, means pivotally mounting said intermediate portion of said sub-ranging arm to the other end portion of said main ranging arm, a sub-ranging jack operatively connected between said main ranging arm and said sub-ranging arm for pivoting the latter relative to said

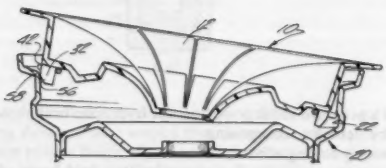


main ranging arm, said sub-ranging arm being pivotal between a first position generally parallel to said main ranging arm and a second position generally perpendicular to said main ranging arm, drum means rotatably mounted on said two end portions of said sub-ranging arm such that when sub-ranging arm is in said first position, said coal mining machine is operable to effect cutting along a height substantially equivalent to the diameter of one of said drums and when said sub-ranging arm is in said second position, said mining machine is operable to effect cutting along a height substantially equivalent to the sum of the diameter of said two drums.

4,027,919
WHEEL COVER

Edwin E. Foster, and Thomas E. Foster, both of Austin, Tex., assignors to Michael Ladney, Jr., Grosse Pointe Shores, Mich.

Filed May 22, 1975, Ser. No. 579,903
Int. Cl.² B60B 7/00
U.S. Cl. 301—37 TP **18 Claims**

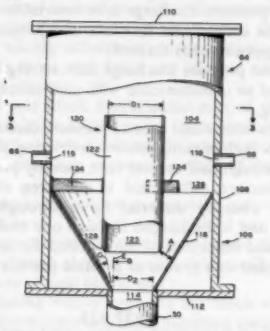


1. A wheel cover adapted for application to the outboard face of a vehicle wheel of the type having a radially inwardly facing annular surface concentric with the wheel axis and with which the wheel cover is adapted to frictionally engage to retain the cover on the wheel, said cover having an annular portion which, when the cover is applied to the wheel, overlies said annular surface of the wheel, a spring wire ring mounted on the inboard face of the cover concentric with said annular portion, said ring lying in a generally flat plane perpendicular to the central axis of said annular portion of the cover, said wire ring having a plurality of at least three radially outwardly extending projections thereon adapted to engage said annular surface when the cover is applied to the wheel, said projections being spaced apart circumferentially around said ring and being connected by portions of the ring extending circumferentially between the projections, the outer ends of said projections defining a circle having a diameter at least slightly greater than the diameter of said annular surface of the wheel when the ring is in the unstressed condition, said projections having generally parallel side edge portions extending generally radially of the ring in the plane thereof, said projections being relatively rigid in a radial direction and acting as rigid columns when radially inwardly directed forces are applied to the radially outer ends thereof, said circumferentially extending portions of said ring being resiliently flexible radially in the plane of the ring in response to radial displacement of said projections, a plurality of ring mounting means on the inboard face of the cover spaced apart circumferentially to correspond with the circumferential spacing of said projections, each of said mounting means having a pair of radially extending guide surfaces thereon spaced apart to engage said side edge portions of said projections with a close sliding fit for preventing relative circumferential and axial movement between the ring and the cover, said close sliding fit also preventing radial displacement of the ring as a whole relative to the cover while permitting free radial inward movement of the projections relative to the cover, said circumferentially extending portions of said ring between said projections being relatively free of the cover in a radial direction to permit flexing thereof in the plane of the ring without transmitting forces to the cover when the projections are displaced radially inwardly.

4,027,920
DISTRIBUTOR

Jerald Meeker Wennerstrom, Canal Fulton, Ohio, assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Oct. 14, 1975, Ser. No. 622,353
Int. Cl.² B65G 53/34
U.S. Cl. 302—28 **4 Claims**



1. In combination with a pneumatic transport system having at least one distributor and means for passing gas entrained particles therethrough, said distributor including an upright cylindrical vessel, an upright open-ended cylindrical member coaxially disposed within said vessel and defining therein an inner passageway of uniform horizontal cross-sectional area throughout, the upright member and vessel being spaced from one another to form an outer annular passageway therebetween, the vessel having a plurality of uniformly spaced outlets opening to said outer passageway and a circular inlet disposed in coaxial and subjacent spaced relation to said upright member, support means connecting the upright member to the vessel, an inverted frusto-conical filler piece disposed within the vessel and defining therein a sloped bottom extending downwardly from below the vessel outlets to the vessel inlet perimeter, conduit means for conveying the gas entrained particles to the distributor, said conduit means terminating at the circular inlet, and the horizontal cross-sectional area of the inner passageway being greater than the horizontal cross-sectional area of the vessel inlet thereby assuring the passing of substantially all of the gas entrained particles through the inner passageway prior to discharge from said vessel outlets.

4,027,921

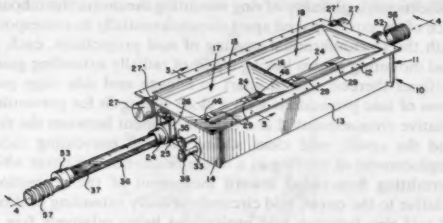
PRESSURE PROBE UNLOADING DEVICE FOR PNEUMATIC OPERATED DISCHARGE GATES

Franklin P. Adler, and John D. Pavolka, both of Michigan City, Ind., assignors to Pullman Incorporated, Chicago, Ill.

Filed July 15, 1976, Ser. No. 705,723

Int. Cl.[2] B65G *53/14, 53/40*

U.S. Cl. 302—52 **10 Claims**



1. A hopper discharge arrangement including a housing adapted to be connected for communication with the discharge opening of a hopper,

said housing including downwardly and inwardly sloping sides, terminating in an elongated discharge opening,

an elongated first tube open at its ends rigidly connected to said housing below said elongated opening and communicating therewith,

valve means regulating the flow of material through said elongated opening, and

removable closure caps for the open ends of said first tube, the improvement comprising;

a second pressure discharge tube insertable through one of the open ends of said first tube and projecting outwardly from opposite ends thereof,

said second pressure discharge tube having opening means adapted to communicate with said elongated discharge opening,

and means within said second pressure discharge tube adjacent to said opening means restricting the air pressure flow through said second tube thereby providing a negative pressure differential in the area of said opening means whereby material flows through said opening means and is discharged through one end of said second tube, said other end of said second discharge tube being connected to a source of positive pressure.

4,027,922

HYDRAULIC SERVO-BRAKE ARRANGEMENT FOR DOUBLE CIRCUIT BRAKES

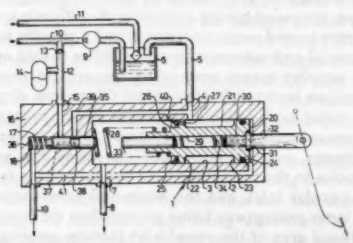
Heinrich August Schlicker, Stenungsund, Sweden, assignor to AB Volvo Penta, Goteborg, Sweden

Filed Mar. 12, 1976, Ser. No. 666,332

Claims priority, application Sweden, Mar. 13, 1975, 7502824

Int. Cl.[2] B60T *60/548, 13/28*

U.S. Cl. 303—6 R **7 Claims**



1. A hydraulic servo-brake arrangement for a vehicle brake system having two brake circuits, comprising a cylinder having an inlet connected to a fluid reservoir and an outlet connected to a first said brake circuit, a piston movably mounted in said cylinder and having a piston rod for connection to the vehicle brake pedal, a valve housing having an inlet connected to a pressure source and an outlet connected to the second said brake circuit, a valve body movably mounted in said valve housing, said valve housing communicating with the first brake circuit such that the pressure in the first circuit forces the valve body in a direction to open the connection between said pressure source and the second brake circuit, said second brake circuit communicating with said cylinder such that the pressure in the second brake circuit forces the piston in a direction to increase the pressure in the first brake circuit, the piston being mounted for limited displacement in relation to the piston rod, and means for mechanically displacing the valve body in the opening direction after a predetermined piston rod travel in the braking direction.

4,027,923

PRESSURE REDUCER DEVICE

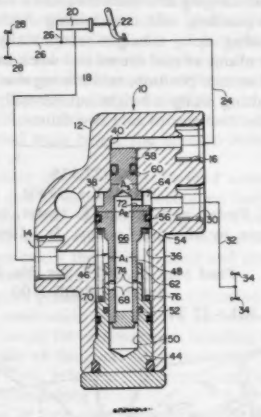
Yuichi Saito, Tokyo, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 23, 1975, Ser. No. 643,707

Claims priority, application Japan, Dec. 25, 1974, 49-147941

Int. Cl.[2] B60T *8/26*

U.S. Cl. 303—6 C **6 Claims**



1. In a pressure reducer device, for hydraulic brake systems in motor vehicles, comprising:

a housing having a bore;

pressure responsive valve means within said bore of said housing having a cylindrical portion having a closed bore and a land portion projecting radially from said cylindrical portion,

said land portion sealingly engaging said bore of said housing to axially divide the same into a high pressure chamber and a low pressure chamber,

said cylindrical portion having at least one valve port at that side thereof from said land portion which is exposed to said high pressure chamber and at least one opening at that side thereof from said land portion which is exposed to said low pressure chamber, said at least one valve port opening to said closed bore of said cylindrical portion, said at least one opening opening to said closed bore of said cylindrical portion;

an end plug closing one end of said bore of said housing, said end plug having a blind bore sealingly and slidably receiving said that side of said cylindrical portion which is exposed to said high pressure chamber, said end plug

having an integral sleeve disposed coaxially with and in alignment with said blind bore,

said pressure responsive valve means having a first effective area exposed to said high pressure chamber pressure and a second effective area exposed to said low pressure chamber pressure after closure of said at least one valve port by said sleeve; and

spring means biasing said pressure responsive valve means in a direction assisting said high pressure chamber pressure;

the force applied to said pressure responsive valve means by pressure acting on said second effective area after the closure of said at least one valve port by said sleeve biasing said pressure responsive valve means to a closed position against the force of said spring means;

the improvement comprising said sleeve slidably receiving that side of said cylindrical portion which is exposed to said high pressure chamber to open and close said at least one valve port to limit transmission of pressure from said high pressure chamber to said low pressure chamber through said at least one valve port, said closed bore of said cylindrical portion and said opening without the the presence of a seal.

4,027,924

ANTI-SKID BRAKE CONTROL DEVICE FOR VEHICLES

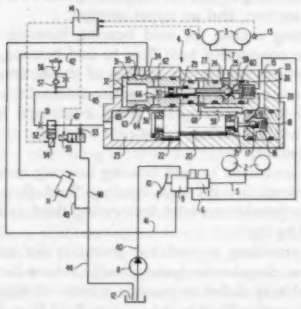
Toshiyuki Kondo, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Mar. 2, 1976, Ser. No. 663,031

Claims priority, application Japan, Mar. 13, 1975, 50-30873

Int. Cl.² B60T *8/00, 13/68*

U.S. Cl. 303—92 **6 Claims**



1. A brake system comprising first fluid circuit means including fluid pressure source means, operator actuated master cylinder means fluidically connected with said pressure source means, wheel brake cylinder means fluidically connected with said master cylinder means and actuator means including control valve means for controlling fluid pressure from said master cylinder means to said wheel brake cylinder means and power piston means operatively associated with said control valve means and second fluid circuit means including said fluid pressure sources means, reservoir means, auxiliary fluid pressure operated means disposed between said pressure source means and said reservoir means and throttle valve means disposed between said auxiliary fluid pressure operated means and said pressure source means and further fluidically connected with said power piston means of said actuator means; said throttle valve means including a first throttle valve disposed between said auxiliary fluid pressure operated means and said pressure source means for throttling the pressure downstream of said first throttle valve in response to the pressure from said master cylinder means and a second throttle valve disposed between said power piston means of said actuator means and said pressure source means for throttling the pressure downstream of said second throttle valve in response to the actuation of said first throttle valve.

4,027,925

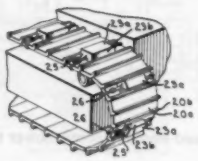
DETACHABLE ROAD PROTECTING DEVICE FOR TRACKED VEHICLES

Chester A. Black, Black Trac-Pad, Box 296, Stanley, Kans. 66223, and Lester A. Black, 1106 Second St., Alva, Okla. 73717

Continuation of Ser. No. 469,092, May 13, 1974, abandoned. This application June 26, 1975, Ser. No. 590,617

Int. Cl.² B68D *55/08*

U.S. Cl. 305—46 **10 Claims**



1. Track and road protecting means for use with individual track elements of an endless tracked vehicle, successive track elements of said endless track having a transverse cleat on the outboard surface thereof adjacent one end thereof, comprising, in combination:

a resilient, flexible, deformable yet shape-retaining block under load adapted to fit on the outboard face of a single track element of an endless track and positioned thereon,

said block substantially rectangular in plan, side and end views and having substantially rectangular, paired and parallel side faces, end faces and inboard and outboard load bearing faces,

the length of said block a substantial part of the distance from cleat to cleat of successive track elements,

the height of the block substantially greater than the cleat height from the clean outboard surface of the track element, and

the width of the block at least a substantial part of the width of the track,

means for connecting the block to the opposite side edges of an individual track element positioned laterally of each of the side faces of said block, and

resilient tensioning means engaging the block with the inboard portion thereof and the connecting means with the outboard portions thereof,

said tensioning means including a coil spring.

4,027,926

ANTI-SKID CONTROL SYSTEM FOR VEHICLES

Hiroshi Arai, Toyota; Akira Nakamura, Susono; Akio Sugiura, Nagoya; Atutoshi Okamoto, Toyohashi, and Koichi Toyama, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Apr. 30, 1975, Ser. No. 573,151

Claims priority, application Japan, May 13, 1974, 49-53623

Int. Cl.² B60T *8/10*

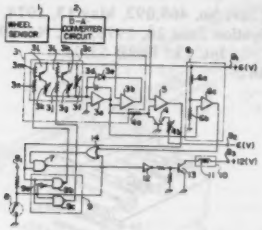
U.S. Cl. 303—109 **13 Claims**

1. In an anti-skid control system for a vehicle comprising a wheel sensor for detecting the rotational speed of a wheel of a vehicle in motion, locking decision means connected to said wheel sensor for detecting when said wheel is on the verge of locking in accordance with an output signal of said wheel sensor and generating a braking pressure releasing signal, and braking pressure modulating means connected to said locking decision means and responsive to said braking pressure releasing signal for modulating the braking pressure applied to said

wheel to eliminate the application of excessive braking pressure, the improvement comprising:

vehicle speed detecting means for generating a vehicle speed signal corresponding to the vehicle body speed of said vehicle in motion;

auxiliary means connected to said vehicle speed detecting means for limiting the modulation of the braking pressure by said braking pressure modulating means when said



vehicle speed signal becomes lower than a predetermined value;

a deceleration sensor for detecting the deceleration of the vehicle body of said vehicle; and

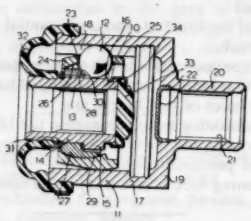
inhibiting means connected to said deceleration sensor for inhibiting operation of said auxiliary means when a detecting vehicle deceleration signal becomes lower than a predetermined level.

4,027,927

UNIVERSAL JOINTS

Colin Francis Samuel Turner, Sutton Coldfield, England, assignor to GKN Transmissions Limited, Birmingham, England

Filed July 9, 1976, Ser. No. 703,893
Int. Cl.² F16C 9/06
U.S. Cl. 308—72 **9 Claims**



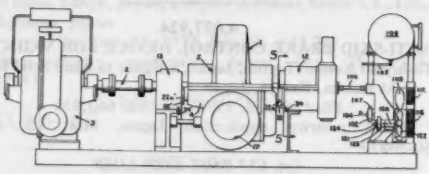
1. In a plunging constant velocity universal joint comprising a hollow outer member and an inner member which are formed with pairs of opposed longitudinally extending grooves, torque transmitting balls which are each engaged in and between a pair of said grooves in the inner and outer members and are movable along the grooves to permit relative angular and axial (plunging) movement between the members, a ball cage which is located between the inner and outer members and is formed with apertures in which the balls are located and a guide member which is mounted on the inner member or a member fixed thereto so as to be axially movable relative to the inner member, the cage having a convex part-spherical outer surface which engages the surface of a cylindrical bore in the outer member or a member fixed thereto whereby the cage is movable relative to the outer member axially of the latter, and a concave part-spherical inner surface which engages a complementary convex part-spherical surface provided on the guide member, the part-spherical surfaces of the cage having centers of curvature which are offset by an equal amount on opposite sides of the joint center along the joint axis whereby the cage is operative to assist in maintaining the balls in the bisector plane of the joint thereby to provide the constant velocity ratio characteristics of the joint, the improvement wherein the guide member is axially movable relative to the inner member or the said member fixed thereto to a limited extent to allow the torque-transmitting balls to roll rather than skid with respect to the surfaces of the grooves in the inner and outer members over part only of the permitted plunging movement of the joint substantially less than the whole range of permitted plunging movement.

4,027,928

COOLING AND LUBRICATION ARRANGEMENT FOR WATER COOLED BEARINGS HAVING SELF CONTAINED LUBRICATION SYSTEMS

John G. Williams, Warren, N.J., assignor to Turbodyne Corporation (Steam Turbine Div.), Wellsville, N.Y.

Filed June 1, 1976, Ser. No. 691,232
Int. Cl.² F16C 1/24
U.S. Cl. 308—77 **25 Claims**



1. In a cooling and lubrication arrangement for a bearing supporting a rotatable member,

a. bearing housing means for supporting said bearing having a lower section, and an upper section,

b. connecting means for said bearing housing means to minimize conductive heat flow to said bearing,

c. a partition in said lower section of the bearing housing means defining therein on opposite sides of the partition, means forming a sump for a self contained lubrication system for the bearing, and means forming a cooling fluid flow chamber;

d. means connected to said bearing housing means and in communication with said cooling fluid flow chamber means to provide an inlet for cooling fluid and an outlet for cooling fluid,

e. means providing an internal geometry for said cooling fluid flow chamber including, baffle means between said inlet and said outlet to provide a zone of relatively high velocity cooling fluid in the cooling fluid flow chamber at the portion thereof closely adjacent to the bearing, and

f. means connected to said inlet and outlet for circulating cooling fluid to and returning the same from said cooling fluid flow chamber.

4,027,929

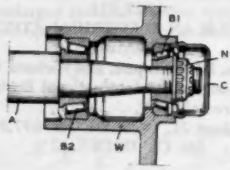
BEARING LUBRICATOR

Jack M. Huddleston, Fort Gibson, Okla., assignor to National Distillers and Chemical Corporation, New York, N.Y.

Filed Sept. 12, 1975, Ser. No. 612,893
Int. Cl.² F16C 1/24
U.S. Cl. 308—97 **7 Claims**

1. A bearing lubricator comprising a tubular element having a hand-hold portion at the outer extremity thereof, an intermediate inwardly tapered portion, and an elongated and angularly offset restricted passageway extending inwardly from the opposite extremity of said tubular element and communicating with said inwardly tapered portion, said restricted passageway terminating in a narrow elongate arcuately curved discharge orifice; a lubricant receiving chamber having an open mouth extending inwardly through said hand-hold portion to

said intermediate inwardly tapered portion and communicating therewith; and an outwardly projecting lubricating fitting



securely mounted within said open mouth in sealed relationship with respect to said lubricant receiving chamber.

4,027,930

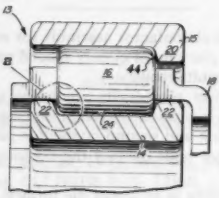
BEARING ASSEMBLY AND METHOD

Ernest J. Bodensieck, Scottsdale, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Dec. 19, 1975, Ser. No. 642,510

Int. Cl.² F16C *19/00*

U.S. Cl. 308—202 **15 Claims**



1. An antifriction bearing assembly comprising:

an outer circular bearing race;

an inner circular bearing race concentric with said outer race;

a plurality of bearing members arranged between said bearing races;

opposed, upstanding end flanges on said inner race defining a depressed raceway therebetween receiving said bearing members, said bearing members having end faces engagable with the adjacent end flanges; and

at least one of said end flanges having a convex surface engageable with the adjacent end face of each bearing member to define a wedge shaped space between said convex surface and the adjacent end face disposed radially outwardly of the location of contact between said convex surface and the adjacent end face, said wedge shaped space arranged whereby rolling movement of said bearing member on said depressed raceway forces a lubricating fluid flow into said wedge shaped space to provide a hydrodynamic fluid film between said convex surface and the adjacent end face at said location of contact.

4,027,931

FLEXIBLE DAMPED BEARING SUPPORT

Keith L. Streifert, Duanesburg, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Oct. 3, 1975, Ser. No. 619,324

Int. Cl.² F16C *35/08*

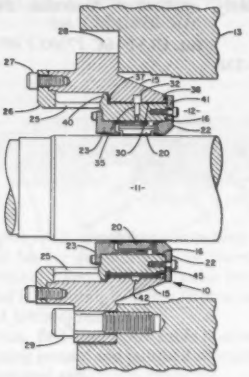
U.S. Cl. 308—15 **10 Claims**

1. The method of rotatably supporting a rotor structure within a stationary machine frame including

mounting a bearing for supporting the rotor shaft within a movable member,

suspending the member from the machine frame upon a series of resilient springs,

establishing a fluid damping film between the member and the machine frame, and



biasing the movable member with a force having a magnitude and direction sufficient to offset the static weight of the rotor structure to prevent preloading of the resilient springs and degrading of the damping film.

4,027,932

CLUTCH RELEASE BEARING

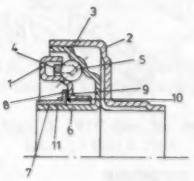
Heinrich Kunkel, Schweinfurt; Manfred Brandenstein, Aschfeld; Armin Olschewski, Schweinfurt; Sigismund Finzel, Dittelbrunn; Willi Gossmann, Niederwerrn, and Peter Horling, Mainberg, all of Germany, assignors to SKF Industrial Trading and Development Company B.V., Nieuwegein, Netherlands

Filed May 20, 1975, Ser. No. 579,266

Claims priority, application Germany, May 25, 1974, 2425351

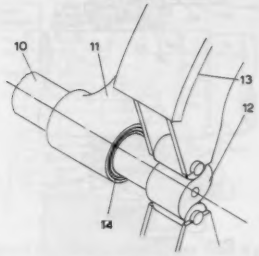
Int. Cl.² F16C *19/00*

U.S. Cl. 308—233 **9 Claims**



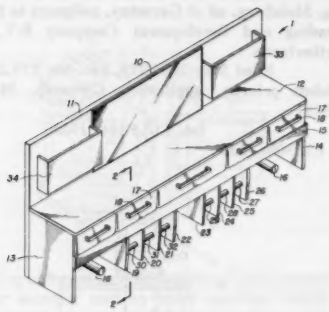
1. In a clutch release bearing operable with a lubricant and including inner and outer rings, rolling elements arranged therebetween, and a holding ring mounted to a first of the bearing rings and holding the two bearing rings and the rolling elements together as an assembly, the improvement comprising a radial flange on said second of said bearing rings and said holding ring comprising a hydrodynamic thrust bearing, said holding ring having a second radial flange closely adjacent said first radial flange, said flanges having facing surfaces, and means for developing, during relative rotation of said surfaces, hydraulic pressure in said lubricant between said surfaces urging same apart and urging said bearing rings together in a direction for preventing radial displacement therebetween.

4,027,933
SHAFT BUSHES
Gordon Joseph Taylor, 18 Seng St., Graceville, Queensland 4075, Australia
Filed June 18, 1976, Ser. No. 697,462
Claims priority, application Australia, June 24, 1975, 2109/75
Int. Cl.² F16C 27/00
U.S. Cl. 308—238 6 Claims



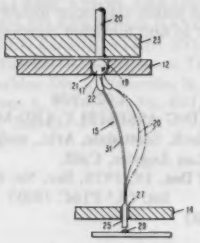
1. A shaft bush of tough, deformable material and including; a first part threaded at one end; a second annular part correspondingly threaded to engage the thread on said first part; and external inwardly-facing radial faces on said first and on said second parts; so that the length of said bush between said faces may be adjusted by relative rotation of said parts to clamp said bush tightly against a housing for said bush.

4,027,934
VALET RACK
John A. Wiser, P.O. Box 192, Liberty, Tex. 77575
Filed June 23, 1975, Ser. No. 589,417
Int. Cl.² A47B 88/00; E05B 73/00
U.S. Cl. 312—321 8 Claims



1. A valet rack comprising
a body having an opening therein,
a drawer movably located in said opening and having a first metal member fixedly attached at the back thereof in operable alignment with a second metal member immobily affixed to said body for contacting the first metal member on said drawer only when said drawer is in the closed position in said body, at least one of said metal members being magnetized, thereby releasably maintaining the drawer in the closed position by magnetic attraction, and
a plurality of independent hanger elements positioned in operable relationship with said body, each hanger element, comprising means for horizontally and slidably mounting to said body, a back plate, at least one holding member projecting from said back plate toward an adjacent back plate or wall of said body and spring means for biasing said hanger elements together.

4,027,935
CONTACT FOR AN ELECTRICAL CONTACTOR ASSEMBLY
Herbert P. Byrnes, Poughkeepsie, and Richard Wahl, Fishkill, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed June 21, 1976, Ser. No. 697,812
Int. Cl.² H01R 9/12
U.S. Cl. 339—48 8 Claims

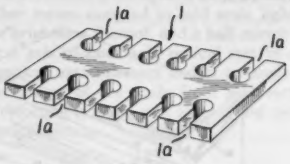


1. In an electrical contactor assembly for making electrical connections to a plurality of closely spaced pads on a product such as a chip simultaneously;
a plurality of short, electrically conductive contacts made of thin spring wire each arranged in said assembly to extend between a first and second connector pad when the second connector pads contact the contacts of said assembly;
means for pivoting in an upper die formed on a first end of each of said contacts so as to make wiping contact with said respective first connector pads;
a substantially straight short neck section extending away from said means for pivioting toward said second pad;
a curved central section extending from the end of said neck towards said second pad with a large radius such that the ends thereof are offset with respect to one another in the plane containing said radius;
a short straight end section extending from the other end of said curved central section toward said second connector pads through a lower die and having the end thereof adapted for contacting the second connector pad;
said curved center section of said contacts deflecting in the plane containing said radius and said pivot means pivoting when said second connector pads apply force to the contacts, thereby applying a minimal pressure to said second connector pads and maintaining high frequency electrical uniformity.

4,027,936
CONNECTOR HAVING ELECTRO-CONDUCTIVE RUBBER TERMINAL
Hideo Nemoto, Sakura, and Yuuji Koike, Matsudo, both of Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan
Filed July 16, 1975, Ser. No. 596,219
Claims priority, application Japan, July 22, 1974, 49-86968[U]
Int. Cl.² H01R 11/02
U.S. Cl. 339—59 M 1 Claim

1. A connector having electro-conductive rubber terminals comprising: an electrically insulated casing having a platelike shape and having along at least one of its outer marginal side edges a row of recesses, each recess having a generally keyhole configuration defined by a linear portion extending inwardly a given distance from the peripheral edge of said casing and terminating in an enlarged opening portion; and a plural-

ity of electro-conductive rubber terminals disposed within respective ones of said recesses, each rubber terminal having a generally keyhole configuration defined by a branch portion lying within its corresponding recess linear portion and terminating in an enlarged terminal portion lying within its corresponding recess opening portion, said enlarged terminal portion projecting in a direction transverse to said platelike casing beyond both major surfaces of said casing, said enlarged terminal portion of each rubber terminal having a cylindrical shape both ends of which project beyond said major surfaces of said casing, and said branch portion of each rubber terminal lying flush with both major surfaces of said casing.

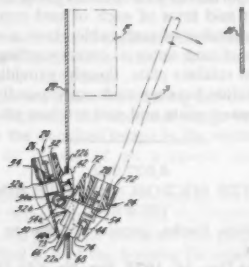


4,027,937

ELECTRICAL TERMINAL BLOCKS

Alexander R. Norden, 350 Central Park West, New York, N.Y. 10025

Filed Jan. 20, 1975, Ser. No. 542,293
Int. Cl.² H01R *9/10, 13/60, 13/62*
U.S. Cl. 339—66 M **14 Claims**



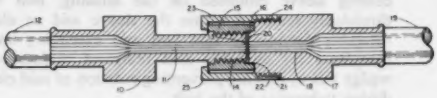
1. A terminal block having a plurality of circuit connectors each having at least one terminal screw and the terminal screws being arranged for operation by screw-driver thrust generally in a common direction for securing circuit connections to said connectors, and an insulating body supporting said circuit connectors, said insulating body having means for retaining the terminal block in an opening in a mounting panel, said retaining means including a pair of flexible detents each having an abutment portion for locking engagement with a marginal portion of a panel at such an opening, and said insulating body including means providing a recess essentially opposite to said screw-driver thrust, said flexible detents facing away from each other at opposite sides of the terminal block, said opposite sides adjoining the side of the terminal block at which said recess is provided, said recess opening away from the screws for receiving an edge of a terminal block mounting panel complementary to the recess, whereby application of thrust to said screws is resisted directly by the terminal block adjacent said recess without imposing substantial stress on said terminal-block retaining means.

4,027,938

FIBER OPTIC CABLE CONNECTOR

Adolph L. Lewis, La Mesa, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 1, 1976, Ser. No. 701,467
Int. Cl.² G02B *5/16*
U.S. Cl. 350—96 C **5 Claims**



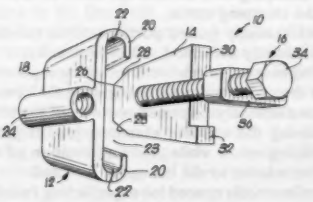
1. A fiber optic cable connector comprising:
- a first ferrule having an internal bore therethrough to receive the end of a first fiber optic cable bundle and bonding material for securing said first fiber optic cable bundle within said internal bore,
- said first ferrule, first fiber optic cable bundle, and bonding material being ground and polished substantially optically flat at a terminal end;
- external threads on a portion of said first ferrule at its terminal end;
- a collar member internally threaded and dimensioned to engage over said external threads and having a cylindrical portion coaxially extending beyond the terminal end of said first ferrule;
- a second ferrule having an internal bore therethrough to receive the end of a second fiber optic cable bundle and bonding material for securing said second fiber optic cable bundle within said internal bore,
- said second ferrule, second fiber optic cable bundle, and bonding material being ground and polished substantially optically flat at a terminal end having a cylindrical embossment dimensioned to be received within the coaxially extending portion of said collar member for aligning said first and second fiber optic cable bundles; external threads on the outermost portion of said second ferrule at its terminal end; and
- a connection sleeve having internal threads at one end dimensioned to engage the external threads of said second ferrule and an inwardly diposed flange at its other end dimensioned to bear upon an end of said collar member for drawing said terminal ends together in aligned assembly.

4,027,939

ELECTRICAL CONNECTOR

Thomas William White, 612 E. 74th Terrace, Kansas City, Mo. 64131

Filed Mar. 3, 1976, Ser. No. 663,258
Int. Cl.² H01R *7/06*
U.S. Cl. 339—247 **1 Claim**



1. A connector assembly for electrically joining a pair of cable members, comprising:

a housing having structure defining respective cable receiving areas therein for receiving said pair of cable members;

a wedge block positioned within said housing and complementally configured therewith for tightly wedging said cable members into the body members, said wedge block having a tapered leading portion, a generally planar rearmost surface and a lug extending rearwardly from said rearmost surface; and

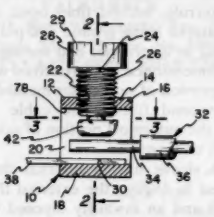
means for drawing the wedge block into wedging engagement with said cable members and including a bolt receiving sleeve mounted on the housing, bolt means threadably received within the sleeve and an element rotatably carried by said bolt and extending laterally therefrom for engaging said rearmost surface of the wedge block, said lug preventing rotation of said element during tightening of the bolt.

4,027,940

ELECTRICAL CONNECTOR WITH CAPTIVE CLAMPING JAW

Charles F. Mazzeo, Scotch Plains, N.J., assignor to Amerace Corporation, New York, N.Y.

Filed Aug. 10, 1976, Ser. No. 713,298
Int. Cl.² H01R 7/14
U.S. Cl. 339—272 R **13 Claims**



1. In an electrical connector of the type including a contact member having opposite top and bottom walls and opposite side walls, a clamping surface on the bottom wall and a clamping screw having axially opposite ends and a screw thread, the clamping screw being received within the top wall of the contact member for clamping a conductor between one of the opposite ends of the clamping screw and the clamping surface, the improvement comprising:

a cup-like clamping jaw placed over said one of the opposite ends of the clamping screw and including a clamping base juxtaposed with the one end and a circumferentially continuous, generally tubular wall extending axially from the clamping base toward the other of the opposite ends of the clamping screw;

circumferentially spaced portions of the tubular wall being permanently deformed radially inwardly;

coupling means integral with the clamping screw at the one end thereof cooperatively engaging the circumferentially spaced inwardly deformed portions of the tubular wall for retaining the cup-like clamping jaw in place upon the clamping screw while enabling rotation of the clamping screw relative to the clamping jaw; and

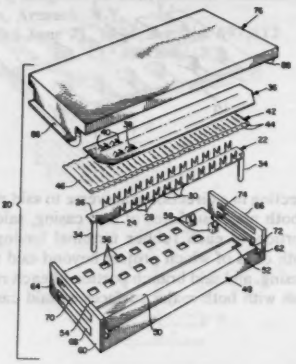
circumferentially spaced lobes projecting radially outwardly between the inwardly deformed portions a radial distance sufficient to engage at least one of the side walls of the contact member to preclude rotation of the clamping jaw upon rotation of the clamping screw.

4,027,941

TERMINATION METHOD AND APPARATUS FOR FLAT FLEXIBLE CABLE

Ronald S. Narozny, Panorama City, Calif., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed Nov. 1, 1976, Ser. No. 737,952
Int. Cl.² H01R 3/06
U.S. Cl. 339—14 R **25 Claims**



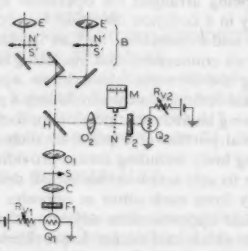
1. Terminating apparatus for multiconductor flat flexible cable comprising, in combination: an elongate metallic contact plate having a plurality of contact elements having tines extending outwardly therefrom and integral therewith; and an elongate metallic retainer plate having a plurality of apertures, one for each of said contact elements and located therein coincident with corresponding ones of said plurality of contact elements and dimensioned to receive and embrace said tines of corresponding ones of said contact elements; said contact plate and said retainer plate being arranged to receive therebetween a portion of a flat flexible cable and to be urged together so that said tines of each of said contact elements penetrate the insulation of such cable about a corresponding conductor thereof and enter a corresponding one of said apertures of said retainer plate, thereby providing a common electrical connection between such corresponding conductors through said contact plate and said retainer plate.

4,027,942

MICROMETER MICROSCOPE WITH BINOCULAR VIEWING

Tatsuzo Fukushige, Osaka, Japan, assignor to Kogaku Ltd., Osaka, Japan

Filed Dec. 16, 1975, Ser. No. 641,591
Int. Cl.² G02B 27/32
U.S. Cl. 350—10 **2 Claims**



1. A micrometer microscope, comprising, in combination; a main optical system having a light source, means coupled to the light source for adjusting the brightness thereof, a filter, a condenser lens, and a single objective lens in a single line

along the optical axis of said system, binocular eyepieces symmetrically arranged with respect to the opticaly axis, and reflecting means on said single line for reflecting the image on said line to both said binocular eyepieces; and a further optical system having a scale projecting lens, a negative of a scale, a micrometer connecter to said negative, a scale light filter and a scale light source arranged on a further optical axis perpendicular to and intersecting the optical axis of said main optical system, further means coupled to said scale light source for adjusting the brightness thereof, and a half mirror on said line on the optical axis of said main optical system at the point where said optical axes intersect and at an angle thereto for receiving the image of the scale from said further optical system and directing it along said line of said optical axis of said main optical system.

4,027,943

SOLAR PROMINENCE ADAPTER

George Everett, Belden Road, Burlington, Unionville, Conn. 06085

Continuation of Ser. No. 399,693, Sept. 24, 1973, abandoned. This application Sept. 19, 1975, Ser. No. 615,126

Int. Cl.² G02B *23/00*

U.S. Cl. 350—17 **6 Claims**

1. A solar prominence adapter for a telescope, comprising:

a housing having a first coupling portion adapted for connection with the eyepiece holder of the telescope and a second coupling portion adapter for connection with an eyepiece;

occulting means supported inside the housing in a first plane and on the longitudinal axis of the housing for occulting an image in that plane;

means supported inside the housing and on said longitudinal axis for focusing the occulted image in a second plane whereby the occulted image in the second plane may be viewed by means of an eyepiece connected to the adapter,

a filter supported inside the housing on the longitudinal axis, the filter being rotatable about the longitudinal axis of the housing and pivotable about an axis perpendicular to the longitudinal axis of the housing for enabling the filter to be tuned to the desired optical wavelength; and

means adjacent the first coupling portion for attenuating the radiation entering the housing to enable viewing of solar prominences when the adapter is positioned between the eyepiece holder of the telescope and the eyepiece.

4,027,944

ILLUMINATED SYSTEM FOR VERTICAL FLUORESCENT MICROSCOPY

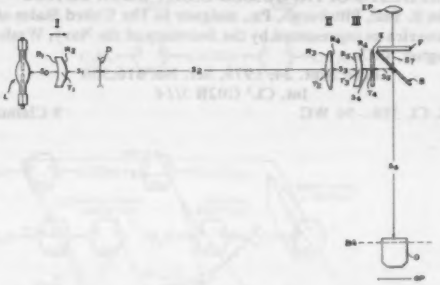
Nathan Gottlieb, Kenmore, N.Y., assignor to American Optical Corporation, Southbridge, Mass.

Filed Feb. 9, 1976, Ser. No. 656,765

Int. Cl.² G02B *21/06*

U.S. Cl. 350—91 **3 Claims**

1. A vertical illuminator for imaging a light source at a microscope objective back aperture to illuminate an object under examination through the microscope objective in fluorescent microscopy which comprises, in sequence and optical alignment along an axis, a light source, an axially-moveable positive meniscus lens I having an aspheric convex surface, a positive biconvex lens II, a negative meniscus lens III and a beam splitter for introducing light from said source into a



microscope observation system, whereby an object is illuminated through said observation system.

4,027,945

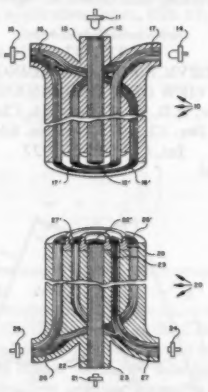
OPTICAL SLIPRINGS

Myren L. Iverson, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 4, 1976, Ser. No. 663,889

Int. Cl.² G02B *5/16*

U.S. Cl. 350—96 C **11 Claims**



1. An optical slipring for transferring light signals between a first body and a second body which is fixed for rotation about an axis relative to the first body, comprising:

a first light carrying member attached to one of said bodies and having a plurality of separate elongated fiber optic input bundles, said elongated fiber optic input bundles being joined to define a plurality of separate optical input terminals and a common projection terminal; and

a second light carrying member attached to the other body and having a plurality of separate elongated fiber optic output bundles, said elongated fiber optic output bundles being joined to define a common reception terminal and a plurality of separate optical output terminals;

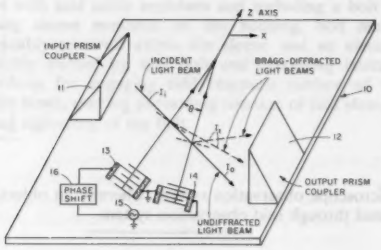
said projection and reception terminals being maintained in aligned proximity in a confronting relationship, centered about said axis of rotation.

4,027,946

ACOUSTO-OPTIC GUIDED-LIGHT BEAM DEVICE

Chen S. Tsai, Pittsburgh, Pa., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 24, 1975, Ser. No. 616,338
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 WG **9 Claims**



1. An acousto-optic light deflector comprising, in combination

a substrate having an optical waveguide formed along one boundary surface thereof;

means for coupling a light beam into said substrate such that said light beam normally travels through said waveguide along a predetermined path;

means for launching a pair of surface acoustic waves along said boundary surface in directions such that both surface acoustic waves simultaneously change the index of refraction of a portion of said path whereby said light beam is deflected therefrom; and

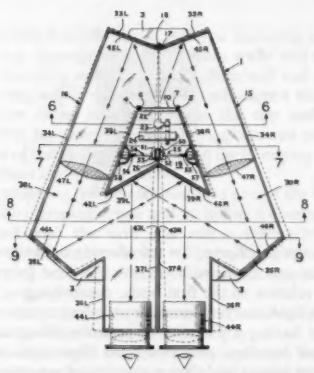
means for extracting said deflected light beam from said substrate.

4,027,947

OPTICAL DEVICE FOR PROVIDING A THREE DIMENSIONAL VIEW OF A TWO DIMENSIONAL IMAGE

Leonard J. Taylor, R.D. No. 2, Box 824, Chester, N.J. 07930

Filed Dec. 12, 1975, Ser. No. 640,068
Int. Cl.² G02B 27/22
U.S. Cl. 350—144 **5 Claims**



1. An optical device for viewing a two dimensional image in three dimensional form comprising:

a. holder means

b. a right viewing box assembly and a left viewing box assembly pivotally connected in said holder means and respectively disposed on opposite sides of the longitudinal center line thereof,

c. means connected to the respective right viewing box assembly and left viewing box assembly for moving the same towards and away from each other and towards and away from the longitudinal center line of said holder means,

d. an image receiving means on said holder means for holding the two dimensional image therein,

e. said right viewing box assembly having a first mirror means at one end optically associated with the image receiving means to provide a first image of the two dimensional image therein,

f. said left viewing box assembly having a second mirror means at one end optically associated with the image receiving mean to provide a second image of the two dimensional image different from the first image,

g. said right viewing box assembly having a right eye viewing member and said left viewing box assembly having a left eye viewing member at the respective end thereof remote from the end optically associated with the image receiving means,

h. said right viewing box assembly having a right cross-over opening along the longitudinal center line of the holder means and inward of the right eye viewing member, and said left viewing box assembly having a left cross-over opening along the longitudinal center line of the holder means inward of the left eye viewing member and in alignment with the right cross-over opening,

i. said right viewing box assembly having a right eye viewing mirror optically associated with the right eye viewing member disposed adjacent the right cross-over opening, and said left viewing box assembly having a left eye viewing mirror operatively associated with the left eye viewing member disposed adjacent the left cross-over opening, and

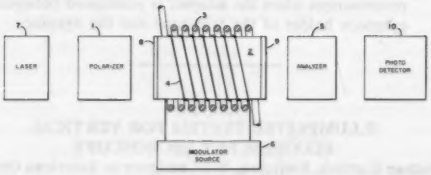
j. coacting optical transmitting systems respectively in said right viewing box assembly and said left viewing box assembly including lens means and at least one transmitting mirror for transmitting said respective first image from said first mirror means through said cross-over opening to the left eye viewing mirror and said second image from said second mirror means through said left cross-over opening to the right eye viewing mirror so that the resolved image viewed will be in three dimensional form.

4,027,948

LOW LOSS LASER MODULATOR

George A. Tanton, and Harry C. Meyer, both of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 15, 1976, Ser. No. 667,226
Int. Cl.² G02F 1/09
U.S. Cl. 350—151 **3 Claims**



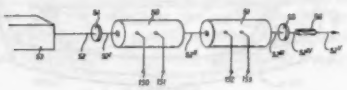
1. A system comprising electro-magnetic radiation polarized at a first angle; controlled means for rotating the polarization angle of said radiation; analyzer means for varying the intensity output of said radiation in accordance to the polarization angle; signal means connected to said controlled means so as to cause a change in the polarization angle in proportion to the value of the signal means; said radiation being directed through said controlled means to and through said analyzer means; said electro-magnetic radiation is a beam

of laser radiation at a predetermined frequency; polarizer means positioned between said laser radiation and said controlled means so as to provide the polarization of the laser beam; said analyzer is a further polarizer means; said controlled means comprises a modulating material containing two narrow absorption lines either side of said predetermining frequency of said laser beam; and a field producing means for producing a static electro-magnetic field aligned through said modulated material in the direction of said travel of said laser beam.

4,027,949
OPTICAL SYSTEMS

Daniel Richard Lobb, Farnborough, England, assignor to Redifon Limited, London, England

Filed Sept. 23, 1975, Ser. No. 616,078
Claims priority, application United Kingdom, May 13, 1975, 20001/75; June 8, 1971, 19417/71
Int. Cl.² G02B *27/00*
U.S. Cl. 350—150 **14 Claims**



1. An optical system comprising a source of a beam of plane polarised polychromatic radiation and, in sequence in the path of the radiation beam an input birefringent optical waveplate, a first controllably birefringent electro-optic cell, an output birefringent optical waveplate, and an optical analyser; the radiation beam comprising two constituents distinguished by radiation wavelength; each birefringent optical waveplate being designed and arranged substantially to rotate the direction of polarisation of one beam constituent through 45° while leaving the state of polarisation of the other beam constituent substantially unaltered; the electro-optic cell being arranged to resolve a first radiation constituent into two substantially equal parts plane polarised at right angles and introduce a relative phase shift between these two parts, the magnitude of the phase shift being determined by an electrical signal applied to the first electro-optic cell, while leaving the state of polarisation of the second beam constituent substantially unaltered, whereby the first radiation constituent is polarisation modulated while the second radiation constituent is substantially unaffected; the optical analyser being arranged to transmit radiation plane polarised in a preferred direction at 45° to the directions of polarisation of the plane polarised parts of the first radiation constituent, thus converting the polarisation modulation of the first radiation constituent into intensity modulation, controlled by the electrical signal applied to the first electro-optic cell.

4,027,950
ELECTRO-OPTICAL DISPLAY DEVICE

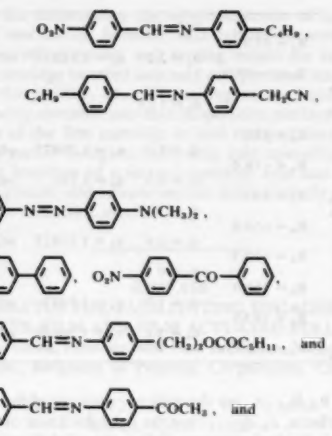
Akio Moriyama, Katano; Masakazu Fukai, Nishinomiya; Hiroshi Tatsuta, Katano; Hiroaki Takahashi, and Hiroshi Esaki, both of Moriguchi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Aug. 16, 1974, Ser. No. 497,935
Claims priority, application Japan, Aug. 20, 1973, 48-93523
Int. Cl.² C09K *3/34*; G02F *1/13*
U.S. Cl. 350—160 LC **2 Claims**

1. An electro-optical display device comprising

i. two electrode plates, at least one of which is transparent,

ii. a nematic liquid crystal composition interposed between said plates, wherein said composition has positive dielectric anisotropy and consists essentially of a nematic liquid crystal material with negative dielectric anisotropy and at least one non-liquid crystal compound selected from the group consisting of

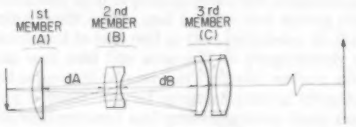


iii. means for applying an electric field across said composition.

4,027,951
PARFOCAL LOW-MAGNIFICATION MICROSCOPE OBJECTIVE LENS SYSTEMS

Ikuo Mori, and Yoshiyuki Shimizu, both of Kawasaki, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Oct. 10, 1975, Ser. No. 621,347
Claims priority, application Japan, Oct. 19, 1974, 49-11989
Int. Cl.² G02B *21/02*
U.S. Cl. 350—175 ML **4 Claims**



1. A parfocal low-magnification microscope objective lens system comprising:

a positive first lens member disposed at a position nearest to the object and with its convex surface facing the object;

a negative second lens member disposed at a position farther from said object than said first lens member and including at least one negative meniscus lens component having its convex surface facing the object side; and

a third positive lens member disposed at a position farthest from said object and including a positive lens component with that surface thereof sharper in radius of curvature facing the image plane side;

said lens system satisfying the following four conditions:

$$d_A < f_A < d_A + |f_B| \quad (1)$$
$$d_A < d_B \quad (2),$$
$$f_B < f_A \quad (3),$$
$$d_B < f_B \quad (4),$$

where f_A is the composite focal length of the first lens member, f_B is the composite focal length of the second lens member, d_A is a rear focal plane of the first lens member to front focal plane of the second lens member distance, and d_B is a rear focal plane of the second lens member to front focal plane of the third lens member distance, the parameters of said system having the following values:

		WD=5.5			
1st member (A)	$R_1 = 14.8$	$d_1 = 2.2$	$n_1 = 1.58913$	$\nu d_1 = 61.2$	
	$R_2 = -600.0$				
		$d_2 = 13.1$			
2nd member (B)	$R_3 = 45.0$	$d_3 = 3.0$	$n_2 = 1.74077$	$\nu d_2 = 27.7$	
	$R_4 = -16.0$	$d_4 = 0.5$	$n_3 = 1.713$	$\nu d_3 = 53.9$	
	$R_5 = 5.487$	$d_5 = 16.7$			
3rd member (C)	$R_6 = -54.8$	$d_6 = 2.8$	$n_4 = 1.51823$	$\nu d_4 = 59.0$	
	$R_7 = -12.7$	$d_7 = 0.1$			
	$R_8 = 360.0$	$d_8 = 1.0$	$n_5 = 1.7495$	$\nu d_5 = 35.0$	
	$R_9 = 18.85$	$d_9 = 3.1$	$n_6 = 1.50032$	$\nu d_6 = 81.9$	
	$R_{10} = -20.38$				

wherein $R_1, R_2, \ldots$ are the radii of curvature of the individual surfaces, $d_1, d_2 \ldots$ are the axial thickness or spacing of the individual elements, WD is the axial distance from the object to the first surface of the lens system, $n_1, n_2 \ldots$ are the refractive indexes of the individual elements and $\nu d_1, \nu d_2, \ldots$ are the Abbe numbers of the individual elements.

4,027,952

SINGLE OPTICAL LENS WITH LARGE APERTURE AND LARGE FIELD

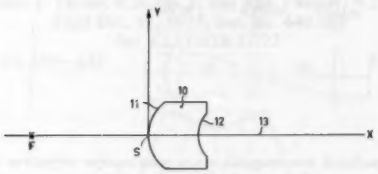
Edgard Alfred Hugues, Courbevoie, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 7, 1975, Ser. No. 575,148

Claims priority, application France, May 14, 1974, 74.16628

Int. Cl.² G02B *3/04*

U.S. Cl. 350—189 **6 Claims**



1. A single lens, wherein an expression for the wave front aberration is represented by a series expansion as a function of the aperture, terms of high degree being utilized, the single lens having spherical refractive surfaces, whose parameters are given by the co-ordinates of a point of the region which is bounded in the plane with the coordinate axes

$$\left(\frac{e}{(n-1)f}, \frac{C_2}{C_1}\right)$$

by two straight lines with the respective equations:

$$\frac{C_2}{C_1} = 2.58 - 1.29\,\frac{e}{(n-1)f}$$

$$\frac{C_2}{C_1} = 2.2 - 1.5\,\frac{e}{(n-1)f}$$

and which is situated between these two straight lines, each of the refractive surfaces being of an aspherical shape for minimizing wave-front aberration, the asphericization of the refractive surfaces being expanded in a series which contains terms of at least the sixth degree as a function of the distance between the points of the refractive surface and the axis of revolution to the lens, where n is the refractive index, e is the thickness, f is the focal length, and C_1, C_2 are the osculation curvatures of the refractive faces of the lens.

4,027,953

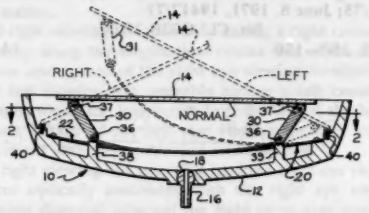
SWITCH CONTROLLED ADJUSTABLE REAR VIEW MIRROR WITH BIMETAL MEANS

Keith D. Jacob, Ann Arbor, Mich., assignor to Donald F. Hassinger, Ann Arbor, Mich.

Filed Mar. 10, 1976, Ser. No. 665,688

Int. Cl.² G02B *5/08*

U.S. Cl. 350—288 **8 Claims**



1. An adjustable rear view mirror for use in a motor vehicle comprising a mirror, means movably mounting said mirror on said vehicle for movement between a normal centered position and positions angled to the left and right of said centered position to enlarge the areas of vision to the left rear and right rear of the vehicle operator, respectively, including bimetal means comprising metallic components having different coefficients of heat expansion, said bimetal means connected to said mirror, and means for heating and thereby expanding said components to cause bending of said bimetal means to move said mirror to said angled positions.

4,027,954

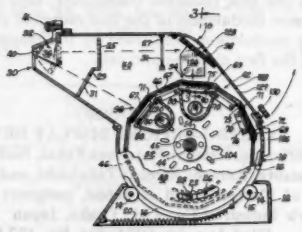
EYE-TESTING APPARATUS

Carleton R. Good, Addison, Ill., assignor to School Health Supply Company, Addison, Ill.

Filed Feb. 10, 1975, Ser. No. 548,383

Int. Cl.² A61B *3/02*

U.S. Cl. 351—17 **1 Claim**



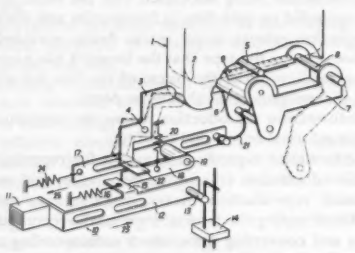
1. Vision testing apparatus of the type adapted to test both far and near vision characteristics comprising: a base, light-occluding casing carried by said base having substantially parallel spaced walls extending from the base, a drum disposed in said casing and rotatable on an axis normal to said walls, means for rotating said drum, said casing having a far vision station and a near vision station disposed along separate portions of the drum periphery, a plurality of transparent far point and near point test objects carried by said drum in position to be selectively moved into alignment with a related test station, a light source disposed within the drum, viewing

means carried by said casing including lens means adapted for optical alignment with said test objects located at either of said test stations, a reflector disposed confronting said far vision station and intermediate said viewing means and said far vision station for defining an angulated visual path therebetween which substantially increases the visual distances between said viewing means and said far vision station while reducing the physical distance therebetween, said viewing means being selectively operated between a first position in alignment with said reflector for viewing far point test objects aligned with said far vision station and a second position for viewing said near point test objects aligned with said near vision station, said near vision station being disposed intermediate said viewing means and said far vision station, and an aperture disposed in one wall of the casing between the far vision station and the reflector to permit an operator to view the test object disposed at the far vision station, characterized by the improved construction wherein a second viewing means is mounted on the casing, said second viewing means is mounted on the casing, said second viewing means having an optical path extending through the aperture substantially parallel to the axis of rotation of the drum and including a second light reflector positioned in said optical path adjacent to the other wall for reflecting the path onto the far vision station and wherein the second viewing means includes a convex lens mounted on the casing adjacent to the aperture.

4,027,955
SOUND-CINE-CAMERA

Willi Reichen, Yvonand, and Robert Aste, Yverdon, both of Switzerland, assignors to Bolex International SA, Ste-Croix, Switzerland

Filed Sept. 23, 1975, Ser. No. 616,046
Claims priority, application Switzerland, Sept. 24, 1974, 12933/74
Int. Cl.² G03B *23/02*
U.S. Cl. 352—72 **2 Claims**

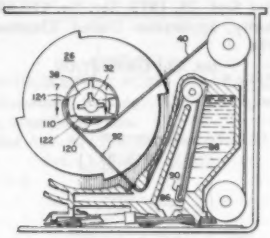


1. In a sound-film-camera comprising, in combination, a compartment arranged to selectively receive a first or a second cartridge, the first cartridge being of smaller dimensions than the second cartridge and containing silent-film without a magnetic sound-track and the second cartridge being of greater dimensions than the first cartridge and containing sound-film tracked with a magnetic sound-track, sound recording means for continuously driving the sound-film and for recording sound onto the sound-film magnetic sound-track, said sound recording means comprising a capstan and a pressure roll movable in and out of engagement with the sound-film against said capstan, and said sound recording means having at least partly an operative and an inoperative condition, release means for controlling the condition of said sound-recording means and being movable between an inoperative position wherein said sound-recording means is in the operative condition and an operative position, a power transfer mechanism interconnected between said release means and said sound recording means, said power transfer mechanism comprising mechanical coupling means movable between an operative position for transferring movement of said release means to said sound recording means and an inoperative position for interrupting the interconnection of said power transfer mechanism between said release means and said sound recording means, and sensing means for sensing the type of cartridge inserted into said compartment and for controlling the position of said coupling means, said coupling means being movable into said inoperative position upon the insertion of the first cartridge in said compartment and said coupling means being movable into said operative position upon the insertion of a second cartridge into said compartment to permit said release means to operatively condition said sound recording means.

4,027,956
APPARATUS FOR FACILITATING ENGAGEMENT BETWEEN FILM AND FILM ACTUATED PULL-STRIP

Joseph A. Stella, Peabody, and Paul B. Mason, Magnolia, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Aug. 12, 1976, Ser. No. 713,693
Int. Cl.² G03C *1/00*
U.S. Cl. 352—130 **12 Claims**



1. In a film cassette comprising a housing, a rotatably mounted reel within the housing presenting an annular surface, an elongated strip of photographic film disposed along a predetermined path within said cassette and having one end thereof connected to said reel so that, responsive to the rotation of said reel, said film strip will be progressively coiled around and supported on said reel's annular surface, said film strip having a bottle shaped aperture passing therethrough adjacent its said one end and extending away from said one end to present in sequence a major portion, a necked-down portion and a locking portion, said cassette additionally comprising a processing station containing a quantity of processing fluid sufficient to coat substantially the entire length of said film strip and actuatable responsive to withdrawal of an elongated strip-like structure having a free end bearing against said film strip intermediate its said bottle-shaped aperture and said reel prior to said film strip being coiled around said reel, said free end of said strip-like structure being formed as a latching tongue presenting a neck-down portion, having a width greater than the width of said necked-down portion of said film strip's aperture, located behind a terminating tongue portion having a width greater than both the width of said necked-down portion and said latching portion of said film strip's aperture but less than the width of said major portion of said film strip's aperture, said latching tongue of said strip-like structure thus being adapted to enter said major portion of said bottle-shaped aperture of said film strip and become disposed between said annular surface of said reel and an adjacent section of said film strip in a folded back manner with respect to other portions of said strip-like structure as said reel is rotated to progressively coil said film strip therearound, the improvement comprising:

a recess formed in said annular surface of said reel and configured to present another surface positioned radially inwardly of said annular surface of said reel, said recess being structured with a width and depth dimensioned to

receive therewithin said latching tongue of said strip-like structure as said film strip is coiled onto said reel and to support said latching tongue on its said other surface to cause it to fold back with respect to other portions of said strip-like structure without squeezing said latching tongue between said other surface of said reel and said adjacent coiled section of said film strip whereby substantial frictional forces are not developed between said latching tongue and said adjacent sections of said reel and said coiled film strip, which forces otherwise would tend to preclude slidable motion between said folded back latching tongue and said adjacent section of said reel and said coiled film strip facilitating said necked-down portion of said strip-like structure's latching tongue snapping through said necked-down portion of said film strip's aperture and entering said locking portion of said film strip's aperture.

4,027,957

ILLUMINATED OPTICAL VIEWERS

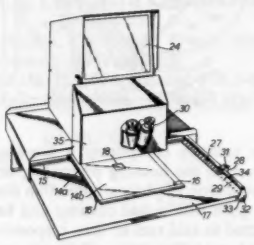
Victor Henry Shaw, Broadstone, England, assignor to Plessey Handel und Investments A.G., Switzerland

Filed Sept. 25, 1975, Ser. No. 616,690

Claims priority, application United Kingdom, Sept. 28, 1974, 42231/74

Int. Cl.² G03B *21/00*

U.S. Cl. 353—21 **6 Claims**



1. An optical device for facilitating corrective operations on a substantially flat object, which comprises: a base structure; an object-conveyor member including an object-supporting element having a flat surface for supporting such object; object-scanning means including two linear guiding means respectively adjustably guiding said conveyor member relative to said base structure in two mutally perpendicular co-ordinate directions, both parallel to said surface; a projection screen exposed to the view of an operator, first optical means supported in said base structure and forming on said screen an enlarged objective image of a small portion of said surface, when said small portion is in a predetermined position relative to said first optical means; illuminating means for illuminating at least that portion of said surface of which an enlarged objective image is thus formed by the first optical means; second optical means forming an enlarged virtual image of small portion of said surface displaced within said surface by a predetermined distance in a predetermined direction from the portion of which the first optical means form such objective image, said virtual image being substantially aligned in the view of an observer with the actual position of said small surface portion; and two-position change-over means which, when moved from a first one of its two positions to its other position, displaces, without affecting the adjusted position of said object-scanning means, said object-supporting element be said predetermined distance in said predetermined direction, whereby an enlarged steroscopic virtual image of the previously projected small portion of said surface becomes available for viewing through said second optical means.

4,027,958

SYSTEM FOR CONTROLLING REPRODUCTION OF AUDIO TAPE IN SYNCHRONISM WITH PROJECTION OF VIDEO FILM

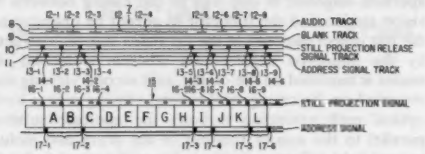
Yoshihiro Shigeta, Toyko; Kuniyoshi Suzaki, Machida, and Mitsutoshi Ogiso, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 397,806, Sept. 17, 1973, abandoned. This application Aug. 21, 1975, Ser. No. 606,643

Claims priority, application Japan, Sept. 22, 1972, 47-95302

Int. Cl.² G03B *31/00, 23/06*

U.S. Cl. 353—26 A **33 Claims**


AUDIO TRACK
BLANK TRACK
STILL PROJECTION RELEASE SIGNAL TRACK
ADDRESS SIGNAL TRACK
STILL PROJECTION SIGNAL
ADDRESS SIGNAL
A B C D E F G H I J K L

1. A system for reproducing video information and audio information in synchronism with each other, said system comprising:

a. A roll film on which the video information, a plurality of still projection signal marks and a plurality of film address marks are optically recorded, said video information being recorded on the film in frame units, and each of said still projection signal marks being provided for each frame of the film for which a still picture projection should be done;

b. a magnetic tape on which the audio information, a plurality of still projection release signal marks and a plurality of tape address marks are magnetically recorded, said audio information being associated with the video information recorded on said film in frame units and each of still projection release signal marks being provided at such a location on the tape that the location has a corresponding relationship to the frame of the film for which the still picture projection should be done;

c. video information reproduction means for reproducing the video information on said roll film;

d. audio information reproduction means for reproducing the audio information on said magnetic tape, said audio information reproduction means including converting means for detecting the tape address marks recorded on the tape and converting same into a corresponding tape stop signal;

e. means for optically detecting the still projection signal marks and the film address marks on the film and for developing corresponding film stop signals;

f. means for detecting the still projection release signal mark on the tape and developing a film start signal;

g. means for transporting the film through a video information reproducing station of said video information reproducing means;

h. means for transporting the tape through an audio information reproducing station of said audio information reproducing means;

i. control means for controlling the film stop and start operation of said film transporting means in accordance with the film stop signal and the film start signal, said control means having a first input terminal connected to said still projection signal mark detecting means, a second input terminal connected to said still projection release signal mark detecting means, and an output terminal connected to said film transporting means, wherein upon receipt of the film stop signal at the first input terminal, said control means causes said film transporting means to stop the film and upon receipt of the film start signal at the second

input terminal, said control means causes said film transporting means to start the film; and

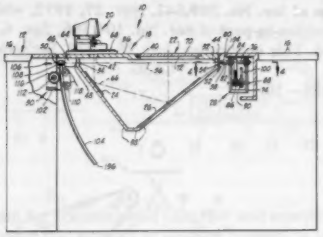
j. retrieving means coupled to each of the two said transporting means, to said converting means and to said optical detecting means for retrieving selected corresponding portions of said tape and said film in response to entered address instructions.

4,027,959

MICROFORM VIEWER FOR USE WITH A RIGID FRAME

Billie Eugene Fisher, 1608 Squirrel Tree Place, Edmond, Okla. 73034, and Thompson Eugene Hodges, 415 Macy, Norman, Okla. 73069

Filed June 30, 1975, Ser. No. 591,643
Int. Cl.² G03B *21/22*
U.S. Cl. 353—77 **6 Claims**



1. A microform viewer comprising:

a housing having a front end, a rear end, an upper surface with an opening therethrough near the front thereof, a longitudinal pivot axis intersecting substantially perpendicularly the middle of the front end of the housing and an end transverse pivot axis perpendicularly intersecting the longitudinal pivot axis near the front end of the housing;

a microform projector mounted on the housing, the microform projector projecting a microform image along a projection axis;

a viewing screen having an upper surface and a lower surface, mounted in the opening through the upper surface of the housing;

a reflector connected to the housing beneath the upper surface thereof and across the projection axis, reflecting the microform image upwadly onto the lower surface of the viewing screen;

a rigid frame having a hole in the upper surface thereof sized to receive the housing;

longitudinal rotation means for pivoting the housing about the longitudinal pivot axis, the longitudinal rotation means having a rear portion connected between the rear end of the housing and the frame and a front portion connected between the front end of the housing and the frame; and

transverse rotation means for pivoting the housing about the end transverse pivot axis, the transverse rotation means having a rear portion connected between the rear end of the housing and the frame and a front portion connected between the front end of the housing and the frame.

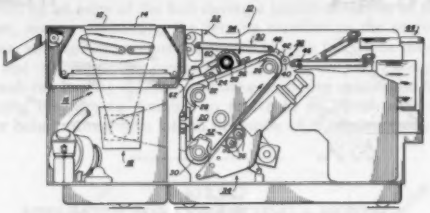
4,027,960

TRANSFER SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE

J. William Ladrigan, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 6, 1975, Ser. No. 602,497
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **6 Claims**

1. An improved transfer system for transferring a developed electrostatic image from a charged photoreceptor to a transfer member, the improvement comprising first means for pressing the transfer member into contact with the developed image while simultaneously applying a first charge to the transfer member of the same polarity as the charge on the photoreceptor and of a magnitude sufficient to both initiate transfer of the developed electrostatic image and electrostatically tack the



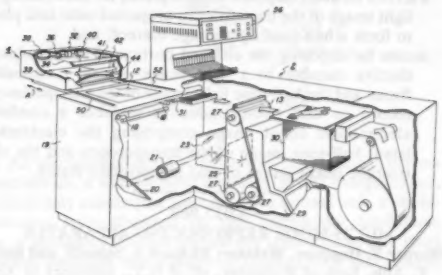
transfer member to the photoreceptor, and second means for applying a second charge to the transfer member while the latter is electrostatically tacked to the photoreceptor, the second charge being of the same polarity as but of a greater magnitude than the first charge, whereby transfer of the developed electrostatic image is completed.

4,027,961

COPIER/RASTER SCAN APPARATUS

Gary K. Starkweather, Saratoga, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 6, 1976, Ser. No. 674,253
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **8 Claims**



1. An apparatus capable of producing output information in hard copy form from more than one type of input information comprising:

a first unit including a light transparent platen, a photoreceptor, a light source, and optical means including a lens for projecting the information content of a document placed on said platen onto a portion of said photoreceptor,

a second unit including means for producing an information modulated, spot size, high intensity beam of light, and means for providing line scanning movement of said beam of light, and

means for mounting said second unit on said first unit such that said second unit can be positioned (1) over said platen whereby a portion of said photoreceptor receives information in accordance with said information modulated beam of light or (2) remote from said platen whereby said platen can receive a document such that the information content of said document can be projected onto a portion of said photoreceptor,

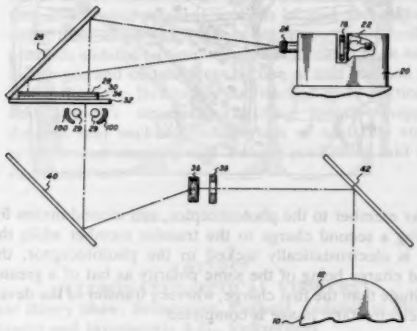
said second unit further including optical means for projecting said information modulated beam of light onto the entrance pupil of said processor lens.

4,027,962

COLOR TRANSPARENCY REPRODUCING MACHINE

Louis D. Mailloux, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 13, 1975, Ser. No. 540,617
Int. Cl.² G03G *15/01*
U.S. Cl. 355—4 11 Claims



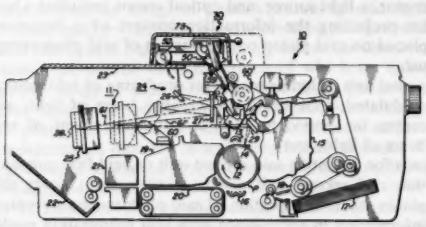
1. An electrophotographic printing machine for reproducing a transparency, including:
a photoconductive member;
means for charging at least a portion of said photoconductive member;
a composition frame;
a platen having said composition frame disposed thereon;
means for projecting a light image of the transparency onto said platen;
a screen member disposed on said platen for modulating the light image of the transparency projected onto said platen to form a half-tone light image thereof; and
means for exposing the charged portion of said photoconductive member to a light image of said composition frame and the half-tone light image of the transparency to record on said photoconductive member a combined electrostatic latent image comprising the electrostatic latent half-tone image of the transparency and the electrostatic latent image of said composition frame.

4,027,963

MULTI-MODE REPRODUCING APPARATUS

Werner F. Hoppner, Webster; Richard A. Spinelli, and Robert F. Allis, both of Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed June 20, 1975, Ser. No. 588,971
Int. Cl.² G03G *15/28*
U.S. Cl. 355—8 14 Claims



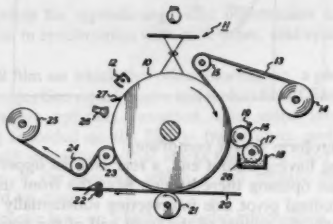
1. In a reproducing apparatus including an imaging surface which moves during operation, means for viewing a stationary document in a first mode of operation and for projecting an image thereof onto said imaging surface, means for viewing a document moving at a first speed synchronized to the speed of said moving imaging surface in a second mode of operation and for projecting an image thereof at a desired magnification onto said imaging surface, the improvement wherein said apparatus further includes:
means for viewing a document moving at a second speed synchronized to the speed of said moving imaging surface in a third mode of operation and for projecting an image thereof onto said moving imaging surface at a reduced magnification as compared to said desired magnification, said second speed being greater than said first speed; and
means for selecting between said modes of operation.

4,027,964

APPARATUS FOR INTERPOSITION ENVIRONMENT

Joseph Fantuzzo, Webster; Robert M. Ferguson, Penfield, and John W. Weigl, West Webster, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 309,842, Nov. 27, 1972, which is a continuation-in-part of Ser. No. 104,386, Jan. 6, 1971, abandoned. This application July 25, 1974, Ser. No. 491,727
Int. Cl.² G03G *15/10*
U.S. Cl. 355—10 2 Claims



1. Electrostatographic imaging apparatus comprising a path defining imaging surface and sequentially positioned with relationship to said path, means to form an electrostatic charge pattern on said imaging surface, means to substantially uniformly contact and maintain said contact with said imaging surface with a thin dielectric film, means to apply a polar liquid developer to the interposed thin dielectric film in image configuration in response to the electrostatic charge pattern on the imaging surface, conductive means to separate said thin dielectric film from said imaging surface with substantially no transfer of charge from said imaging surface to said thin dielectric film and means to transfer said liquid developer from said thin dielectric film to an image receiving surface.

4,027,965

COPYING MACHINE CONTROL MECHANISM

Yoshio Mikasa; Masami Nakane, both of Toyokawa, and Yukio Tokura, Toyohashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 28, 1975, Ser. No. 572,294
Claims priority, application Japan, May 15, 1974, 49-55815[U]; May 31, 1974, 49-62271
Int. Cl.² G03G *15/00*
U.S. Cl. 355—13 9 Claims

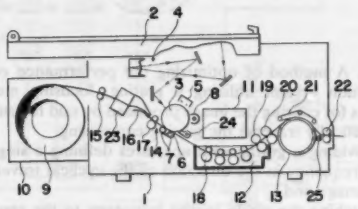
1. In an electrophotographic copying apparatus including a reciprocatingly movable support onto which an original to be copied is placed, a scanning means for driving said support and including a clutch for controlling the drive of said scanning means, a stationary optical system having an illuminating means for projecting an image of the original, a feeding means for feeding a copying paper from a roll along a predetermined path, a feeding clutch coupled to said feeding means, and a cutting means disposed on said path for cutting the copying paper; a control means which comprises:
a movable member on said support for aligning with one end of the original placed on said support and having a

projecting member integral therewith, a cutting switch connected to said cutting means and positioned in the path of said projecting member for being actuated thereby as said support is moved,

a manually actuated copy initiating means having an arm extending therefrom,

a first cam having an engaging portion normally engaged by said arm for preventing said first cam from rotating, said first cam initiating its rotation upon operation of said copy initiating means,

a second cam coaxial with and rotatable together with said first cam for actuating said feeding clutch for feeding the copying paper in substantial synchronism with the initiation of rotation of said first cam,



a third cam for actuating said clutch of said scanning means for moving said support in delayed relation to the initiation of the rotation of said first cam,

said projecting member and said cutting switch being spaced a distance such that when said support is moved said switch is actuated for cutting the copying paper into a length substantially corresponding to the length fed during the rotation of said first cam from the initiation of the rotation until the energization of said clutch by said scanning means by said third cam plus the length fed during the movement of said projecting member until the actuation of said switch thereby.

4,027,966

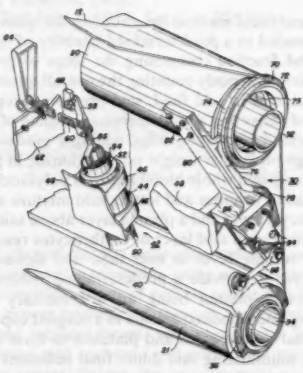
TRACKING ASSEMBLY FOR AN ENDLESS BELT ELECTROSTATIC REPRODUCTION MACHINE

William E. Jordan, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 418,720, Nov. 23, 1973, abandoned. This application Mar. 25, 1976, Ser. No. 670,304

Int. Cl.² G03G *15/00*

U.S. Cl. 355—16 **3 Claims**



1. An improved electrostatic reproduction machine having an endless belt assembly and a stationarily mounted frame member, the belt assembly having a plurality of rollers adapted to support an endless belt having a photoconductive area thereon, the improvement comprising tracking means for sensing a lateral deviation of the belt from its normal course as it moves over a first of the rollers, and for rotating a second of the rollers about an axis in response to any deviation so as to return the belt to its normal course, the tracking means including a sensing member mounted so as to be contacted and moved by an edge of the belt during a lateral deviation of the latter, means connecting the sensing member to the second roller, and resilient means connected to both the frame member and the connecting means for supporting the entire weight of both the sensing member and the connecting means and for causing the sensing member to return to its initial position after being moved by a lateral deviation of the belt.

4,027,967

APPARATUS FOR CONNECTING A MOVING PHOTOCONDUCTIVE WEB WITH A FIXED ELECTRIC POTENTIAL

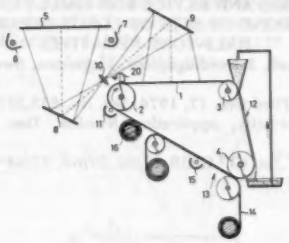
Reinhold Euler, Kelkheim, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt, Germany

Continuation of Ser. No. 329,562, Feb. 5, 1973, abandoned. This application Aug. 2, 1974, Ser. No. 494,303

Claims priority, application Germany, Feb. 7, 1972, 2205601; Netherlands, Feb. 24, 1972, 7202437

Int. Cl.² G03G *15/00*

U.S. Cl. 355—16 **3 Claims**



1. An electrophotographic apparatus comprising a corona charge device, a web movable past said corona charge device, an electrically conductive layer disposed on said web, a photoconductive layer disposed on said electrically conductive layer, a stationary contact electrically connectable to a fixed electrical potential and slidably in contact with said electrically conductive layer, said stationary contact consisting of a carbon layer in contact with said electrically conductive layer, a first and second part between which the carbon layer is elastically supported, a foam cushion and two plate members each of which is attached to one of said parts, said first part of said stationary contact being L-shaped and said second part being spaced from and parallel to the foot of said L-shaped part, said second part and said foot being elongated in the direction of travel of the insulating web, each plate member facing the foam cushion positioned underneath said members.

4,027,968

CAMERA MECHANISM

Harry Arthur Hele Spence-Bate, Lot 115, Cheam Place, Morley, Australia (6062)

Filed June 24, 1975, Ser. No. 589,928

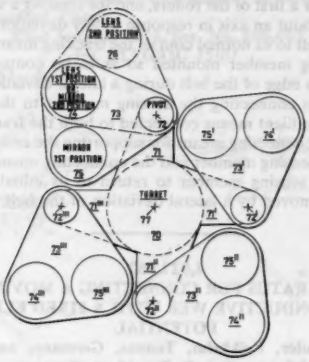
Int. Cl.² G03B *27/32*

U.S. Cl. 355—46 **10 Claims**

1. Optical input means for a microfiche camera adapted to allow selective filming of inputs from at least two different optical sources which comprises:

a rotatable turret plate having mounted thereon a plurality of pivoted support plates, each support plate carrying a lens and a mirror and adapted to pivot in the plane of the

turret plate between two positions, the first of said positions placing the lens in the optical axis of the camera and



the second of said positions placing the mirror in the optical axis of the camera.

4,027,969

METHOD AND DEVICE FOR SIMULTANEOUS SCREENING OF SETS OF COLOR-SEPARATED HALF-TONE NEGATIVES

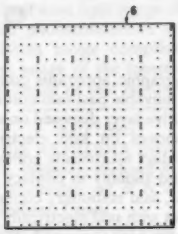
Gunnar Foxell, 5 Hovdingagatan, Hagersten, Sweden (S-126 52)

Filed Dec. 17, 1974, Ser. No. 533,557

Claims priority, application Sweden, Dec. 18, 1973, 7317056

Int. Cl.² G03B 27/60, 27/64, 27/68

U.S. Cl. 355—73 **5 Claims**



1. Apparatus for use in screening half-tone negatives comprising:

a rigid base plate and a superposed relatively thin support plate of resiliently deformable material,

said support plate being pierced by a great number of minute holes for connecting to a vacuum source and having spaced groups of further holes extending through the thickness of the support plate, one hole in each group being threaded and another hole being smooth and having a widened upper portion,

set screws engaging the threaded holes and extending below the bottom surface of the support plate or not, depending on adjustment,

further screws provided with heads inserted in the smooth holes and engaging threaded holes in the base plate, all screws leaving the upper side of the support plate unobstructed and being operative to exercise a pushing and pulling action on the support plate relative to the base plate so as to adapt the configuration of the support plate to an image projected onto the upper surface thereof to counteract the effects of optical distortion on the image.

4,027,970

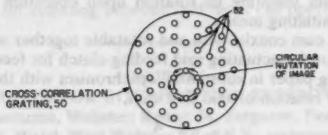
METHOD AND APPARATUS FOR PASSIVE OPTICAL FUSING AND DISTANCE MEASUREMENT

Victor A. Misek, Hudson, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Oct. 28, 1975, Ser. No. 626,383

Int. Cl.² G01C 3/08; G01J 1/20

U.S. Cl. 356—4 **24 Claims**



24. A method of optimizing the performance of a focus detection system utilizing a grating, focusing means, and means for causing the image produced by said focusing means to cyclically traverse the grating comprising:

providing a gratng with apertures defining a single spatial frequency in the direction of the cyclical traverse of the image and,

matching the single spatial frequency to the resolution of the focusing means in terms of in-focus and out-of-focus MTF characteristics for the focusing means.

4,027,971

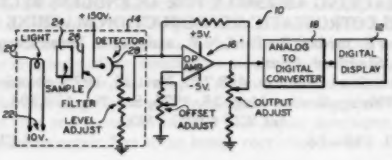
METHOD OF SIMULTANEOUSLY COUNTING BLOOD CELLS

Philip Kolman, 26 Glen Brook Road, Monsey, N.Y. 10942; Maurice J. Dunn, 90 Charles St., Lindenhurst, N.Y. 11757, and David Tiersten, 57 Curtiss Place, Maplewood, N.J. 07040

Continuation of Ser. No. 321,755, Jan. 8, 1973, abandoned. This application Oct. 30, 1975, Ser. No. 627,187

Int. Cl.² G01N 33/16

U.S. Cl. 356—36 **5 Claims**



1. An analytical method for counting the quantity of blood cells suspended in a predetermined quantity of fluid comprising a blood fraction comprising the steps of preparing said fluid for simultaneously counting the overall quantity of leucocytes suspended in said fluid, said preparing step comprising the steps of delivering a predetermined volume of whole blood to a calibrated separation tube, adding a predetermined volume of high molecular weight polysaccharide in physiological saline, mixing said whole blood and said polysaccharide-physiological saline volumes and letting said mixture stand to form an erythrocyte layer and a plasma layer above said erythrocyte layer, waiting until said layer of erythrocytes reaches a predetermined volume level in said tube and siphoning off said plasma layer to provide a predetermined volume of plasma, said siphoned plasma being an intermediary preparation, suspending said siphoned plasma in a reagent capable of lysing any residual erythrocytes and platelets to form a dilute final sediment, illuminating said dilute final sediment with a white light along an optical axis so as to illuminate substantially all of said suspended leucocytes substantially simultaneously; filtering the light directly transmitted through said dilute final sediment at an optical wavelength which passes light which has not been absorbed by said leucocytes, and providing a

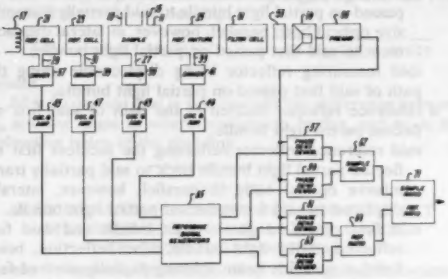
simultaneous count indication of said overall quantity in response to said filtered light.

4,027,972

GAS ANALYZER METHOD AND APPARATUS

Donald W. Davies, Tujunga, Calif., assignor to Andros Incorporated, Berkeley, Calif.

Filed Mar. 31, 1976, Ser. No. 672,058
Int. Cl.² G01J 1/00; G01N 21/24, 21/26, 21/34
U.S. Cl. 356—51 18 Claims



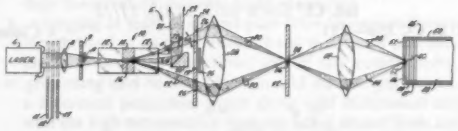
1. A method for determining the relative amounts of first and second gases in an unknown mixture of gases, comprising, directing radiant energy serially through a first reference volume of said first gas, a second reference volume of said second gas, and a sample volume of the unknown gas mixture, said radiant energy having a wavelength spectrum including characteristic absorption wavelengths of said first and second gases, modulating the absorption of the radiant energy by the first and second reference volumes and the sample volume at first, second, and third frequencies, respectively, detecting the amount of radiant energy passing serially through the first and second reference volumes and the sample volume, developing first and second corresponding sideband signals resulting from heterodyning of the energy modulated at the first and third frequencies and at the second and third frequencies, respectively, and obtaining a ratio of said first and second sideband signals.

4,027,973

DETECTOR APPARATUS FOR LASER LIGHT SCATTERING PHOTOMETERS

Wilbur I. Kaye, Fullerton, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed July 2, 1973, Ser. No. 375,930
Int. Cl.² G01N 21/22
U.S. Cl. 356—73 6 Claims



1. In a laser photometer for measuring radiant power scattered from a sample at a selectable angle with respect to the direction of an incident beam of radiant power and for measuring radiant power transmitted through the sample in the direction of said incident beam, said photometer including means for focusing said scattered and said transmitted power into converging conical beams, the improvement comprising means for receiving and detecting said scattered power and said transmitted power and for providing a spatially uniform output indicative of the radiant power of each, said means comprising:

a planar diffuser positioned in the plane of the apices of said conical beams to diffuse said converging beams;

a detector having a large area end-window spaced from and parallel to said diffuser; and

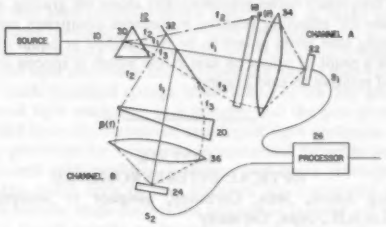
a cylindrical container surrounding said diffuser and said detector, said cylindrical container being enclosed at the end thereof adjacent said diffuser, said enclosed end of said container having an aperture therein through which said beams pass to said diffuser, the inside surfaces of said cylindrical container and said enclosed end being highly reflective whereby the energy reflected from said end-window is reflected by said inside surfaces back to said end-window of said detector.

4,027,974

OPTICAL FREQUENCY PROCESSOR

Jon H. Bumgardner, 738 Felspar, Ridgecrest, Calif. 93555

Filed Dec. 5, 1975, Ser. No. 638,137
Int. Cl.² G01J 3/14
U.S. Cl. 356—74 7 Claims



1. An optical source frequency processor, comprising:

dispersion means fixedly mounted on intercept a beam of radiant energy for providing spatial redirection according to the frequency of beam of radiant energy incident thereon so as to produce a chromatically dispersed output therefrom;

optical means with respect to said dispersion means fixedly positioned so as to intercept the output thereof for spliting said spatially redirected radiant energy into a plurality of beams;

first modifying means fixedly positioned with respect to said optical means for uniformly attenuating one of said plurality of beams;

second modifying means fixedly positioned with respect to said dividing means for attenuating another of said plurality of beams an amount having a predetermined relationship with the amount of spatial redirection introduced by said dispersion means;

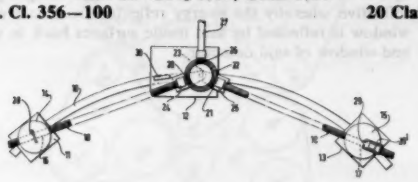
detector means fixedly positioned with respect to said first and second modifying means for separately detecting each of said attenuated beams and providing separate outputs responsive to the intensity of each of said attenuated beams; and

means for processing said outputs effectively connected to said detector means to provide an output definitive of a characteristic of said radiant energy.

4,027,975
SCANNING MONOCHROMATOR AND CONCAVE REFLECTING GRATING EMPLOYED THEREIN

David Turner, London, and Robert John Speer, Reading, both of England, assignors to National Research Development Corporation, London, England

Filed May 27, 1975, Ser. No. 580,920
Claims priority, application United Kingdom, May 28, 1974, 23688/74
Int. Cl.² G01J 3/18; G02B 5/18
U.S. Cl. 356—100 20 Claims

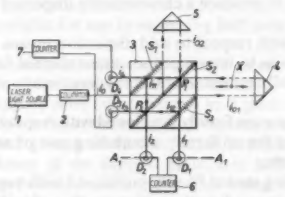


1. A scanning monochromator comprising a reflecting grating having on a concave surface thereof lines which perpendicularly intersect the meridian plane of the grating, source means for providing electromagnetic radiation to irradiate said grating, radiation receiving means for receiving radiation from said source means which has been diffracted by said grating, and means for effecting relative movement between said grating, said source means and said radiation receiving means such that given points of said source means and said radiation receiving means always lie on a circle in said meridian plane which touches said concave surface, characterised in that the radius of curvature of said concave surface in the meridian plane is equal to the radius of said circle, the grating line frequency varies systematically along the grating, and said means for effecting relative movement comprises means for causing said given points to be maintained at equal distances from a point of origin on said circle which is spaced from and fixed relative to said grating.

4,027,976
OPTICAL INTERFEROMETER

Georg Amon, Jena, Germany, assignor to Jenoptik Jena G.m.b.H., Jena, Germany

Filed Apr. 21, 1975, Ser. No. 570,048
Claims priority, application Germany, May 13, 1974, 178453
Int. Cl.² G01B 9/02
U.S. Cl. 356—106 R 7 Claims



1. An optical interferometer for producing two interference patterns 90° phase-shifted relative to each other, particular for use in length measurements, comprising

a light source emitting a light bundle,

a collimator for spreading said light bundle,

a partially transmissive optical body arranged in the path of said light bundle,

said partially transmissive optical body having a first beam splitting partially silvered face, inclinedly arranged relative to the incident light bundle,

a second and a third beam splitting and partially silvered face, substantially in parallel with and equally spaced relative to said first beam-splitting partialy silvered face,

said first beam splitting partially silvered face splitting up said light bundle into a first passed-on partial light bundle and into a first reflected partial light bundle,

a measuring reflector located in the path of said first passed-on partial light bundle,

said measuring reflector back-reflecting the incident first passed-on partial light bundle to said partially transmissive optical body parallel, however, in lateral displacement to said first passed-on partial light bundle,

said measuring reflector being displaceable along the path of said first passed-on partial light bundle,

a reference reflector located in the path of said first reflected partial light bundle,

said reference reflector reflecting the incident first reflected partial light bundle back to said partially transmissive optical body in parallel, however, laterally displaced to said first reflected partial light bundle,

said first passed-on partial light bundle and said first reflected partial light bundle, after reflection, being fused at said first beam splitting partially silvered face of said partially transmissive optical body and producing a first interference pattern,

said first beam splitting partially silvered face splitting up the impinging fused partial light bundles into a second passed-on partial light bundle passed through said face, and into a second reflected partial light bundle reflected thereupon,

the second, reflected partial light bundle being deviated at said second beam splitting partially silvered face, and fusing with the passed through second passed-on partial light bundle, being deviated at said third beam splitting partially silvered face, thereby producing a second interference pattern at said first beam-splitting partially silvered face,

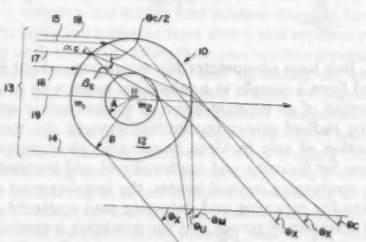
said first interference pattern and said second interference pattern being 90° phase-shifted relative to each other,

and means for evaluation of said interference patterns, phase-shifted relative to each other.

4,027,977
METHOD AND APPARATUS FOR DETERMINING RATIO OF CORE RADIUS TO CLADDING RADIUS IN CLAD OPTICAL FIBERS

Ralph Edward Frazee, Jr., Spotswood Borough, and Laurence Shrapnell Watkins, Hopewell Township, Mercer County, both of N.J., assignors to Western Electric Company, New York, N.Y.

Filed Dec. 17, 1975, Ser. No. 641,697
Int. Cl.² G01B 9/02, 11/08, 11/12
U.S. Cl. 356—111 4 Claims



1. A method of determining the ratio of the core radius to

the cladding radius, A/B, of a clad optical fiber which comprises:

directing a monochromatic coherent light beam at the fiber to generate a far-field scattering pattern including contributions from portions of the beam reflected by the fiber, portions of the beam refracted by both the core and the cladding of the fiber, and portions of the beam refracted only by the cladding of the fiber;

detecting a scattering angle, θ_p, at which the maximum of a fringe modulation component occurs in the scattering pattern; and

converting the detected scattering angle, θ_p, into the ratio A/B from the relationship:

$$A/B = \sin[(\theta_p - \Delta\theta)/2] / \sqrt{m_1^2 + 1 - 2m_1 \cos[(\theta_p - \Delta\theta)/2]}$$

where

$\Delta\theta$ is a constant that is substantially the difference between θ_p and the angle θ_c where modulation begins, and m_1 is the refractive index of the cladding.

4,027,978

METHOD AND APPARATUS FOR NON-CONTACT MEASUREMENT OF A GAUGE OF A HIGH TEMPERATURE MATERIAL

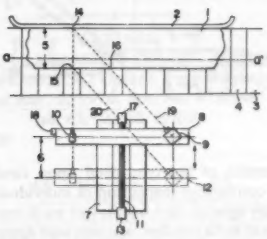
Tomio Yamamoto, Takamatsu; Koji Sakasegawa, Fukuyama; Atsushi Osumi, Fukuyama; Yukio Hosaka, Fukuyama, and Takeo Yamada, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo and Fuji Toyuki Kabushiki Kaisha, Takamatsu, both of, Japan

Filed Jan. 8, 1974, Ser. No. 431,735

Claims priority, application Japan, Aug. 27, 1973, 48-96019; Jan. 10, 1973, 48-5140

Int. Cl.² G01B 11/04

U.S. Cl. 356—156 **14 Claims**



1. A method for non-contact measurement of a gauge of a high temperature material comprising:

a. directing at least one camera tube having a sensitivity to a beam of light of a given wavelength band in the near-ultraviolet zone in a direction such that the optical axis of the camera tube extends in the direction of a gauge of a high temperature material to be measured;

b. arranging at least one band-pass filter having said wavelength band as its transmission band in front of said camera tube along the directional axis of said camera tube;

c. projecting said beam of light in said wavelength band to a reference projection point along said directional axis with the high temperature material being absent from said beam of light;

d. establishing a sampling mark corresponding to an optical mark formed by said beam of light at said reference projection point on the screen of at least one television monitor which displays the output of said camera tube;

e. displaying an optical mark projected by said projection of light on said high temperature material to be measured on said television monitor screen;

f. moving said light source and said camera tube in a direction parallel to said direction of the gauge to be measured by maintaining the light projecting and receiving axes relationships established in said reference projection conditions and in such a manner that said optical mark and said sampling mark on said television monitor screen coincide with each other; and

g. detecting the gauge of said high temperature material from said reference projection point in accordance with the distance covered by said movement of said light source and said camera tube.

4,027,979

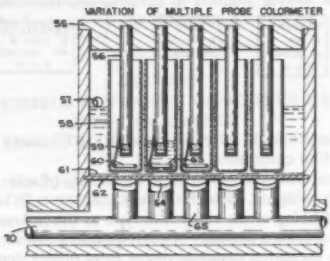
MULTIPLE CHEMISTRY ANALYZER

John Victor Komarniski, 2167 Burr Court, Santa Cruz, Calif. 95062

Filed Apr. 27, 1973, Ser. No. 355,171

Int. Cl.² G01J 3/46

U.S. Cl. 356—180 **3 Claims**



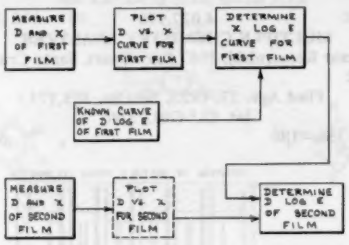
1. A combination of a multiple dilutor and a multiple probe colorimeter both temperature controlled by a circulating liquid for carrying out colorimetrical tests on batches of liquid samples and said multiple dilutor comprising of many modified syringes inclosed in a liquid tight enclosure with part of their tips protruding a few centimeters below the bottom of said liquid tight enclosure and the opposite end of the cylinder part of each modified syringe is anchored in the top part of said liquid tight enclosure in a manner that the plungers are controlled from the outside of said liquid tight enclosure and there is provision for temperature controlled liquid to enter, flow around said modified syringes, and leave through an outlet, the outer ends of said plungers are connected to a movable handle, stops control the amount or reagent, air-bubble, and liquid sample to be metered simultaneously, said multiple colorimeter comprising a light tight enclosure, near the bottom filtered electromagnetic waves are directed up through many lenses that are sealed in a horizontal plane into a second bottom wherein is a temperature controlled liquid bath, reaction tubes with opaque walls and optical bottoms are situated above each said lens in said temperature controlled liquid bath, a removeable cover has many probes with optical bottoms wherein each has an electromagnetic wave sensing device, said probes are attached to said removeable cover in a manner that each said probe enters each said reaction tube and said optical bottom of each said probe rests the same distance from each said optical bottom of said reaction tubes, the said tips of said multiple dilutor are so spaced they fit into each said reaction tube for emptying the test sample and reagent at the proper temperature simultaneously into said reaction tubes which are also at the proper temperature, a stirrer is attached to each said probe in a manner to allow simultaneous agitation by movement of said cover, said filtered electromagnetic waves pass through the liquid samples as they react and to said electromagnetic wave sensing devices which store an electrical current in a manner responsive to the electromagnetic wave absorbing characteristics of its corresponding liquid sample in an electrical storage device, by means of control switches said electrical currents are stored simultaneously at timed intervals in many said storage devices, the said electrical current in each said storage device is interpreted by use of an electrical measuring device.

4,027,980

METHOD OF OBTAINING A D(LOG E) CURVE

Kenneth R. Piech, Williamsville, and John R. Schott, Buffalo, both of N.Y., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 9, 1976, Ser. No. 675,676
Int. Cl.² G01N *21/06*
U.S. Cl. 356—203 **2 Claims**


MEASURE D AND X OF FIRST FILM
PLOT D VS. X CURVE FOR FIRST FILM
DETERMINE X LOG E CURVE FOR FIRST FILM
KNOWN CURVE OF D LOG E OF FIRST FILM
MEASURE D AND X OF SECOND FILM
PLOT D VS. X FOR SECOND FILM
DETERMINE D LOG E OF SECOND FILM

1. A method of determining a D(log E) curve for an unknown film comprising:

a. measuring the densities of a plurality of selected objects appearing on a first film having a known D(log E) curve and being of the same film type as the unknown film;

b. measuring a plurality of corresponding distances in which the measured densities decay from object density to film base density;

c. plotting a second curve with the plurality measured densities and the corresponding distances for the first film;

d. determining an x(log E) relationship for the first film using the known D(log E) curve and the second curve;

e. measuring the densities of a plurality of selected objects appearing on the unknown film;

f. measuring a plurality of corresponding distances for the unknown film in which the measured object densities decays to film base densities; and

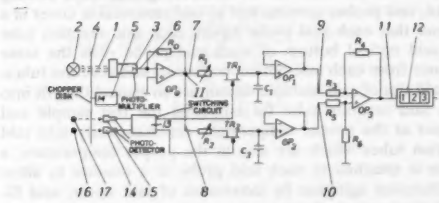
g. determining the D(log E) curve of the unknown film using the measured values of object densities and corresponding measured densities of the unknown film with the x(log E) curve of the first film.

4,027,981

STORAGE CIRCUIT FOR PHOTOMETER

Alfred Steinbatz, Vienna, Austria, assignor to C. Reichert Optische Werke AG, Vienna, Austria

Filed Oct. 28, 1975, Ser. No. 626,672
Claims priority, application Austria, Oct. 14, 1974, 8222/74
Int. Cl.² G01J *1/10, 3/45;* G01N *21/06*
U.S. Cl. 356—229 **7 Claims**



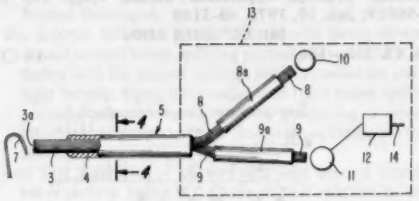
1. In an alternating light photometer, especially a single-beam photometer, in conjunction with which a periodically interrupted beam by means of a chopper disk rotated over a motor is incident on a photoelectric transducer, the corresponding output signal of which is amplified and conducted to a display device, in conjunction with which the chopper disk simultaneously releases, alternatively, an illuminating beam for one of two photo-sensitive elements of a switching circuit, by means of which, switches governing two differential current-paths are alternately controllable, wherein the improvement comprises a storage circuit including the output (6) of the photo-electric transducer (3) is connected with both of the inputs (9, 10) of a differential amplifier (OP_3) over two parallel, uniform current-paths (7–9; 8–10); that in each of both of the current-paths, in series, a resistance (R_1, R_2) is located, and a condensor (C_1, C_2) in conjunction with one of the switches provided (TR_1, TR_2) as well as between switch and corresponding input of the differential amplifier, when the resistance and the condensor of a circuit-path form a low-pass (R_1, C_1; R_2, C_2) with a time-constant (T) lying appreciably over the connecting or disconnecting time of the beam (1) as determined by the rotational speed of the chopper disk (4); and that the switches over the switching circuit (13) are selectively controlled, that one of them is closed only during the time (T_M) of the complete release, and the other one only during the time (T_D) of the complete interruption of the beam to the photoelectric transducer.

4,027,982

NEEDLE DETECTOR FOR CIRCULAR KNITTING MACHINES

Tadashi Ohishi, Osaka, Japan, assignor to Kyodo Denshi Kogyo Co., Ltd., Osaka, Japan

Filed Apr. 23, 1975, Ser. No. 570,789
Int. Cl.² G01N *21/16, 21/30;* D04B *35/10*
U.S. Cl. 356—237 **3 Claims**



1. Apparatus of the type used upon cirular knitting machines for continuous inspection of individual ones of a series of uniformly spaced like needles of such machines to detect faulty ones of such needles, wherein said apparatus is provided with a housing in extension of one end of a tube of predetermined length, the other end of said tube being free, wherein a light source, a photoelectric sensing member and an amplifier operatively related to said sensing member are disposed within said housing, wherein a bundle of a plurality of individual glass fibers of predetermined length are encased within and extend lengthwise of said tube and extend into said housing, wherein said bundle of fibers are divided into a first and a second group thereof with said groups of fibers being spaced within said housing and being intermingled within said tube, wherein said light source is operatively related to the ends of said first group of fibers within said housing, wherein said photoelectric sensing member is operatively related to the ends of said second group of fibers within said housing, wherein said intermingled fibers within said tube terminate adjacent to said free end thereof, said series of needles being movable relative to the ends of said intermingled fibers, said first group of fibers guiding light from said light source to impinge upon each of said moving needles, a quantity of such impinged light being reflected back from each of said needles, said second group of fibers guiding said reflected light to impinge upon said photoelectric sensing member, wherein said housing is disposed so as to be readily adjustable to placesaid free ends of said intermingled fibers in desired location closely adjacent to said moving needles, wherein the space between said needles and said ends of said intermingled fiber is unobstructed. and wherein said

apparatus is provided with means to evaluate said reflected light received by said photoelelctric sensing member,

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4,027,983

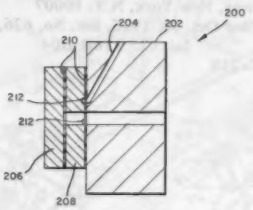
NOVEL GASKET AND FLOW CELL COMPRISING SAME

Louis Abrahams, Worcester, Mass., assignor to Waters Associates, Incorporated, Milford, Mass.

Continuation-in-part of Ser. No. 415,784, Nov. 14, 1973, Pat. No. 3,918,495. This application Apr. 9, 1975, Ser. No. 566,182

Int. Cl.² G01N *1/10*; G01J *1/42*

U.S. Cl. 356—246 8 Claims



1. In a flow cell apparatus of the type comprising a liquid flow path along an optical path, and an inlet to said flow path from the bottom thereof,

the improvement wherein said inlet flow path includes a segment thereof formed in a gasket compressed between said flow cell housing member and a window member, said gasket comprising an aperture forming a portion of said optical path and also a portion of said liquid flow path, and said inlet flow path being formed as a channel in on one side of said gasket and terminating at the bottom of said aperture.

4,027,984

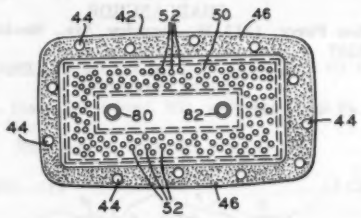
SHAMPOO BRUSH

Robert L. Underwood, 2302 Oxford, Fort Wayne, Ind. 46806

Filed Apr. 5, 1976, Ser. No. 673,640

Int. Cl.² A46B *11/00*

U.S. Cl. 401—28 2 Claims



1. A shampoo brush comprising:

an elongate hollowed handle having a rinsing and dilutant conduit supported therewithin; a housing affixed to said handle and having a shampoo chamber supported therewithin;

said chamber having a plurality of shampoo dispensative first openings formed therein for dispensing shampoo in a first direction; said first openings being symmetrically disposed about a plane parallel to said first direction and substantially bisecting said housing;

pump means for receiving and dispensing shampoo being supported within said chamber; said pump means having a first passage in fluid communication with said chamber and a second passage in fluid communication with said openings; plunger means being reciprocably mounted in said pump means; a pair of first and second one way valves being mounted in said first and second passages respectively and cooperable to admit shampoo into said pump means upon movement of said plunger means in said pump means in one direction and to dispense shampoo from said first openings upon movement of said plunger means in the opposite direction;

an annular fluid chamber being supported in said housing around said shampoo chamber; said annular chamber being in fluid communication with said dilutant conduit;

said housing supporting a surface immediately adjacent said annular chamber and in fluid communication therewith; said surface having a plurality of second openings therein for dispensing rinsing and dilutant fluid in said first direction; said annular chamber supplying said second openings with rinsing and dilutant fluid;

said first openings being positioned within and extending through said surface; an annular track being supported in said housing around said surface; said track supporting a plurality of flexible, resilient elements extending in said first direction and adapted to contact, groom and massage the body area to be shampooed.

4,027,985

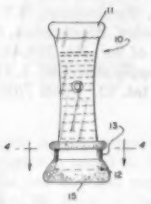
COMPRESSIBLE DISPENSING CONTAINER HAVING PIERCING PRONGS

Ernest W. Loesser, III, 5 Dalewood Drive, Cedar Grove, N.J. 07009

Filed June 16, 1975, Ser. No. 587,066

Int. Cl.² A61M *35/00*; B05C *21/00*

U.S. Cl. 401—134 7 Claims



1. A dispensing container for a flowable material housed therein which substantially completely fills the same, said container comprising sealed upper and lower end portions and a compressible body having a front and rear wall extending between said sealed end portions, said lower portion of said compressible body terminating in a partially collapsed area, a band having an upper and lower edge encircling a portion of said lower partially collapsed end portion area and secured thereto a piercing prong mounted on the upper edge of the said band and being directed towards the front wall only of said container adjacent said partially collapsed area, said piercing prong normally out of contact with the said front wall of said container but adapted to contact and pierce said container wall only upon application of a compressive force intermediate the upper and lower end portions of the container, said compressive force displacing the materials within the container thus causing the walls thereof to bulge outwardly whereupon said piercing prong will pierce the said wall at the partially collapsed area to form an exit opening therein and upon continued application of said compressive force on the walls of the container, the materials within the container will be expelled from therewithin through the said exit opening.

4,027,986

HERBICIDE APPLICATOR

Stanley R. Patrick, 606 Hickory Circle, Canonsburg, Pa. 15317

Filed Oct. 23, 1975, Ser. No. 625,098

Int. Cl.² A01C *23/04*

U.S. Cl. 401—138 9 Claims

1. A herbicide applicator comprising; means for controlling the flow of herbicide fluid so that controlled amounts of fluid

may be applied to unwanted vegetation including, a long hollow body portion for holding herbicide fluid having an applicator means at one end thereof, air control means at the other end thereof, the applicator means including a single

orifice flow control member, the air control means includes an enlarged coupling portion which is threaded internally and an adjustable coarse threaded screw plug for closing the end with the air control being by the air leaks through the coarse threads when the plug is partially loosened.

4,027,987

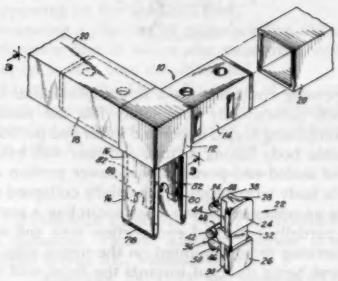
JOINING DEVICE FOR CONNECTING TUBES

Irving L. Berkowitz, Binghamton, N.Y., assignor to Kason Hardware Corporation, Binghamton, N.Y.

Continuation-in-part of Ser. No. 368,453, June 8, 1973, Pat. No. 3,958,889. This application Dec. 2, 1975, Ser. No. 636,847

Int. Cl.² F16B 7/00

U.S. Cl. 403—172 **10 Claims**



1. A joining device for use in connection with one or more tubes, or the like, comprising: a base portion, at least one branch portion integral with and extending from said base portion and capable of insertion into said tubes, locking means carried by said branch portion for holding said branch portion within a tube, said locking means comprising a body portion having a pair of bearing surfaces and being pivotally supported at a position in said branch portion for limited angular movement between first and second predetermined limit positions, said locking means further including protruding retaining surfaces formed as spaced projecting portions integral with said body portion, said body portion including first and second rearward surfaces, each adapted to independently engage an inner wall of said branch portion, thereby defining the extent of said limited angular movement, said bearing surfaces projecting beyond a transverse side of said branch portion, said bearing surfaces being insertable in succession together with said branch portion into a tube whereupon during said insertion a first of said pair of bearing surfaces is substantially freely receivable by the tube and thereafter the second of said pair is only forceably receivable by said tube due to lever action resulting from engagement of said first bearing surface with internal surfaces of the tube, and means for movably securing said locking means to said branch portion said securing means comprising holding means integral with portions of said branch portion for contacting said protruding retaining surfaces, the cooperation of said holding means and said protruding retaining surfaces facilitating arcuate movement of said body portion with respect to said branch portion.

4,027,988

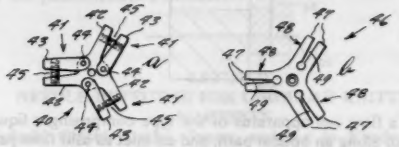
JOINT CONNECTOR FOR BARS

Dong Woo Kum, c/o George Spector, 3615 Woolworth Bldg, 233 Broadway, New York, N.Y. 10007

Filed Oct. 28, 1975, Ser. No. 626,039

Int. Cl.² F16B 7/04

U.S. Cl. 403—218 **3 Claims**



1. In a joint connection, the combination of a pair of jaws, a screw fitted with nut for holding said jaws fixedly together, and a plurality of three bars for being retained between said jaws, said bars crossing each other angularly respective to each other at said joint and being each angular respective to an axis of said screw, wherein said jaws each comprise a spider-like member including three symmetrically extending arms with a cylindrical notch on an inner side of each said arm, and with each arm being segmented for adjustability, a surface of each said notch extending angularly under an adjacent one of said arms, said surface being semicylindrical when viewed from one axial end thereof, said jaws each having a spherical outer surface.

4,027,989

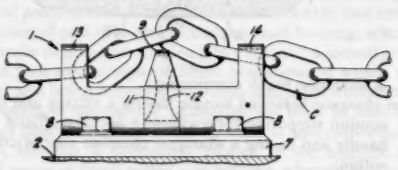
CHAIN ANCHOR

Harless Pierce, 1212 W. Longview Ave., Stockton, Calif. 95207

Filed Aug. 13, 1976, Ser. No. 714,236

Int. Cl.² F16D 1/00

U.S. Cl. 403—291 **14 Claims**

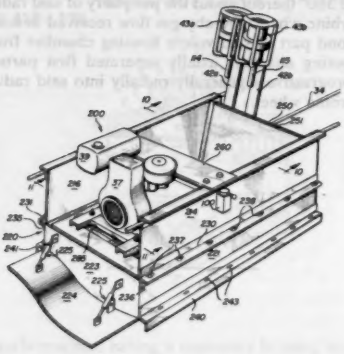


1. A chain anchor comprising a fixed support, an anchor block rigid with and upstanding from the support, the anchor block having a throat open to the top and to opposite faces of said block, the throat being of a depths to receive—from above and in manually disengageable relation—a vertical link of a chain extending in the general direction that the block faces, an immediately adjacent horizontal link of the chain end-abutting one face of said block, the working reach of the chain extending away from the other face of said block, and guard means on the support embracing an adjacent portion of said working reach of the chain in vertical motion limiting relation.

4,027,990
ADJUSTABLE CURBER AND SIDEWALK-FORMING MACHINE

Charles T. Merrill, 760 S. Postville Drive, Lincoln, Ill. 62656

Continuation-in-part of Ser. No. 480,844, June 19, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 619,921
Int. Cl.² B28B *13/04*; E01C *19/48*
U.S. Cl. 404—98 14 Claims

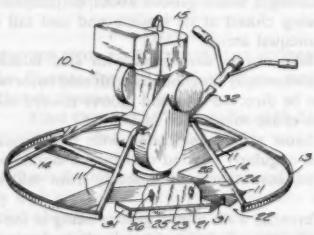


1. Adjustable apparatus for forming contoured concrete as the apparatus travels along forms defining a run, comprising, in combination, first and second machine sides adjustable toward and away from one another and together defining a hopper having at least one wall inclined from a large upper concrete receiving opening to a small lower concretedropping opening and a platform comprising a plurality of floor plates, each plate affixed to a machine side and together mounting motive power means, attachment means on each machine side, for attaching a mold to each machine side, and a detachable mold of fixed width selected from a series of detachable molds of differing fixed configurations and widths, the mold being fitted to the attachment means of both machine sides when the machine sides are located at a predetermined distance from one another, and rail means carried on the mold for guiding the apparatus along run-defining forms.

4,027,991
CONCRETE FINISHER WITH RETRACTABLE GUARD RING SECTION

Helmut A. Maass, West Bend, Wis., assignor to M-B-W, Inc., Slinger, Wis.

Filed Sept. 8, 1976, Ser. No. 721,266
Int. Cl.² E01C *19/22*
U.S. Cl. 404—112 12 Claims

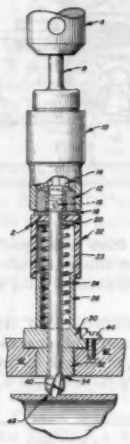


1. In a concrete surface finishing machine having driven finishing paddles surrounded outside their perimeter by a generally concentric guard ring, a gap in said ring, a retractable guard ring segment in said gap and retraction means mounted on said machine on which said segment is mounted for retraction of said segment inwardly to allow the driven finishing paddles to work up to an obstruction disposed at an edge of the concrete surface to be finished.

4,027,992
BORING TOOL GUIDE DEVICE

Bruce A. Mackey, Sr., 2730 E. Bonniebrook, Waukegan, Ill. 60085, and Bruce A. Mackey, Jr., 2-120B Chevy Chase, Mundelein, Ill. 60060

Filed Nov. 17, 1975, Ser. No. 632,646
Int. Cl.² B23B *49/00*
U.S. Cl. 408—97 10 Claims



1. A boring tool guide device comprising in combination;
a spindle chuck adapter, a speed fit driver, a cutter shank having a cutter at one end and means for coupling the shank to the speed fit driver at the other end, a guide body, said guide body including a base portion having an axial bore and a tubular portion extending axially from said base portion and being substantially coaxial with said bore, said guide body having retainer means to secure the guide body to a work fixture, a tubular shaped depth control spacer having an end wall and an axial aperture therein, said control spacer being in telescoping engagement with said tubular portion, said control spacer having means for limiting the distance that the tubular portion of the guide body can be telescoped therein, resilient means received within said tubular portion and said control spacer to bias the control spacer and the guide body axially apart, said cutter shank being guidingly received in the axial bore of said guide body and the cutter and speed fit driver extending beyond the guide body and control spacer respectively, whereby said retainer means can be secured to said work fixture and rotatable driven power means can be removably secured to the speed fit driver to axially feed the cutter along its axis into a workpiece with the maximum depth of penetration being determined by said limiting means.

4,027,993
METHOD AND APPARATUS FOR COMPRESSING VAPOROUS OR GASEOUS FLUIDS ISOTHERMALLY

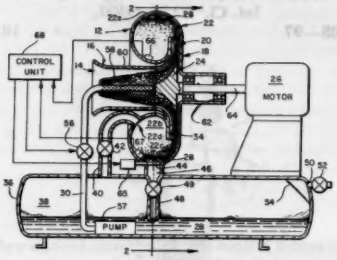
Otto E. Wolff, Weston, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 1, 1973, Ser. No. 402,315
Int. Cl.² F01D *00/00*
U.S. Cl. 415—1 11 Claims

1. A process for substantially isothermally compressing a gas comprising the steps of:
mixing said gas with a foamable liquid to form a foam

thereof having a discontinuous, substantially closed cell distribution of said gas contained within a thin wall continuous distribution of said liquid;

compressing said foam to increase the pressure thereof from a first pressure level to a second, significantly higher pressure level thereby substantially isothermally compressing the gas contained in said foam from said first to said second pressure level;



separating said gas from said liquid portion of said foam within a separation chamber while maintaining the separated gas and the separated liquid at said second pressure level; and

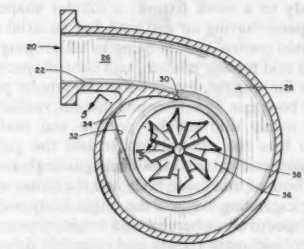
independently withdrawing said separated gas and said separated liquid from said separation chamber and introducing said withdrawn gas to an outlet conduit while maintaining said withdrawn gas at said second pressure level.

4,027,994

PARTIALLY DIVIDED TURBINE HOUSING FOR TURBOCHARGERS AND THE LIKE

Hugh MacInnes, La Canada, Calif., assignor to Roto-Master, Inc., North Hollywood, Calif.

Filed Aug. 8, 1975, Ser. No. 602,928
Int. Cl.² F01D *1/06*
U.S. Cl. 415—1 **15 Claims**



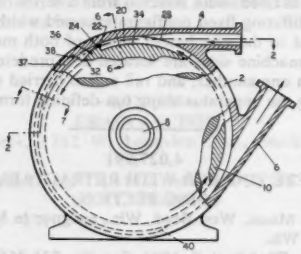
1. In a radial inflow turbine housing for turbochargers and the like, said housing being of the type having a generally 360° volute housing chamber surrounding a radial flow bladed turbine wheel, and an inlet chamber upstream of said volute housing chamber and terminating at the inlet to said volute housing chamber, said volute housing chamber being arranged for receiving gas flow from said inlet chamber and exhausting said gas flow progressively generally radially inwardly circumferentially around said volute housing chamber into said radial flow bladed turbine wheel; the improvement comprising: a radial divider throughout said inlet chamber and continuously circumferentially around said volute housing chamber and extending radially closely adjacent the periphery of said radial flow bladed turbine wheel, said radial divider separating both said inlet chamber and said volute housing chamber into circumferentially continuous axially separated first parts, said volute housing chamber axially separated first parts each exhausting its respective gas flow progressively generally radially into said radial flow bladed turbine wheel circumferentially throughout said separated first parts, said radial divider in said volute housing chamber extending circumferentially continuously from said volute housing chamber inlet and terminating not less than 180° and not more than 300° from said inlet of said volute housing chamber with said volute housing chamber having an undivided second part the remainder of said 360° thereof about the periphery of said radial flow bladed turbine wheel whereby gas flow received in said undivided second part of said volute housing chamber from said volute housing chamber axially separated first parts is exhausted progressively generally radially into said radial flow bladed turbine wheel.

4,027,995

STEAM TRACK TURBINE

Clyde F. Berry, R.F.D. 7 Box 169 C, Manchester, N.H. 03104

Filed July 14, 1975, Ser. No. 595,544
Int. Cl.² F01D *1/02*
U.S. Cl. 415—92 **7 Claims**



1. A steam turbine comprising

a stationary housing,

a rotor mounted for rotation within said housing,

said rotor having a steam groove about its periphery, said groove being closed at its leading end and tail end by faces of unequal areas,

a steam intake nozzle associated with said housing and aligned substantially tangentially with said rotor whereby steam can be directed into said groove toward said leading end to cause rotation of said rotor,

a steam exhaust nozzle associated with said housing and positioned angularly beyond said intake nozzle where it receives exhaust steam continuously from said rotating groove,

the circumferential walls of said groove being in the form of opposed diverging helices of small pitch starting at the smaller leading end face of the groove and terminating at the larger tail end face of the said groove and

a circumferentially extending pressure dividing ridge forming the bottom of said groove, said ridge having a crest and continuous uninterrupted sloping surfaces extending away from said crest toward said walls.

4,027,996

TURBOMACHINE, SUCH AS A STEAM TURBINE WITH HIGH STEAM INLET TEMPERATURE, ESPECIALLY

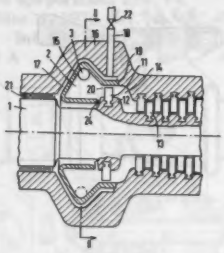
Herbert Keller; Bruno Krieg, and Ludwig Römer, all of Mulheim, Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed July 18, 1975, Ser. No. 597,300

Claims priority, application Germany, July 22, 1974, 2435153

Int. Cl.² F01D 25/24

U.S. Cl. 415—116 2 Claims



1. A turbomachine having a stationary housing and a rotatable rotor mounted therein and including a series of rotor blade rings carried by the rotor and a series of guide vane rings carried by the housing, the guide vane rings and the rotor blade rings being disposed in mutually alternating relationship beginning with a first rotor blade ring, comprising means defining an annular space located forward of the first rotor blade ring of the series of rotor blade rings, flow medium supply means communicating with said annular space for supplying flow medium thereto, said annular space extending radially outwardly and along the entire periphery of the turbomachine for producing a torsional flow of the flow medium, the rotor having a shaft formed with a collar, and the series of rotor blade rings including a first blade ring mounted on said collar directly behind said annular space and being fully exposed at all times directly to said annular space, said first blade ring having a diameter greater than that of the succeeding blade rings of said series, whereby the flow medium supplied to said annular space axially impinges directly on said first blade ring without being initially guided by any guide vane rings, said means defining an annular space comprising a casing spaced from the housing and from the rotor, said casing extending to a location at which it is disposed in spaced relationship between the housing and said first rotor blade ring, and means for supplying flow medium to the space between the housing and said casing cooler than the flow medium supplied to said annular space by said flow medium supply means whereby the housing in the region of said annular space is shielded by cooler medium from the thermal effect of the hotter medium supplied to said annular space.

4,027,997

DIFFUSER FOR A CENTRIFUGAL COMPRESSOR

Alexander Connor Bryans, Reading, Mass., assignor to General Electric Company, Lynn, Mass.

Filed Dec. 10, 1975, Ser. No. 639,232

Int. Cl.² F04D 29/44

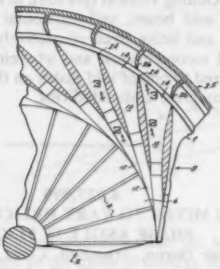
U.S. Cl. 415—207 1 Claim

1. A diffuser for diffusing the accelerated gas flow from a relatively high pressure centrifugal compressor to an annular combustion chamber comprising:

an annular housing circumscribing the centrifugal compressor;

a plurality of passages spaced about the circumference of the housing and extending therethrough, each passage having a substantially linear center line;

wherein the inlet to each of the passages is circular in cross-section and disposed to receive the accelerated gases exiting the centrifugal compressor and each of the passages gradually merge to a near retangular cross-section at its outlet which is defined by two float opposing axial spaced parallel sides and two opposing curved circumferential sides formed as arcs of a circle, such that the inter-



nal walls of the passages in proximity to the diffuser outlet are formed as two flat parallel walls and two opposed slightly curved walls with the curved walls being convex with respect to the passage center line; and

wherein the curved walls terminate in a relatively sharp edges at the diffuser inlet and outlet.

4,027,998

FIXING ARRANGEMENT FOR A GUIDE PART OF A FIXED CASING ON A ROTATING MACHINE

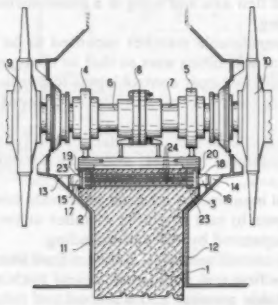
René Schwartz, Belfort, France, assignor to Groupe Europeen pour la Technique des Turbines a Vapeur G.E.T.T. S.A., Paris, France

Filed Jan. 14, 1976, Ser. No. 649,002

Claims priority, application France, Jan. 16, 1975, 75.01301

Int. Cl.² F01D 25/24

U.S. Cl. 415—219 R 2 Claims



1. In a machine assembly comprising:

at least one machine having at least one rotating machine part,

a concrete support beam,

a first journal bearing mounted to the top of said concrete beam and rotatably supporting said rotating machine part for rotation about the part axis, and

a casing for said at least one machine,

the improvement comprising:

a first casing guide part fixed to said casing and extending longitudinally relative to said rotating machine part,

a second guide part, and

means for fixing the second guide part to said beam in juxtaposition to said first part, with said second part

extending longitudinally adjacent said first guide part to guide said casing in its movement relative to said beam,

and wherein said means for fixing said second guide part to said beam comprise first and second plates positioned against opposed lateral walls of said concrete beam, said plates including vertical ribs sunk in the mass of concrete forming said beam, and horizontal tie rods extending laterally and being fixed respectively to the ribs of said first and second plates, and wherein said second guide part is fixed to one of said plates on the side opposite that of said concrete embedded ribs.

4,027,999

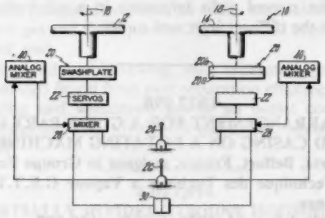
ANALOG MIXER TO VARY HELICOPTER ROTOR PHASE ANGLE IN FLIGHT

Ronald Arthur Durno, Trumbull, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Nov. 13, 1975, Ser. No. 631,599

Int. Cl.² B64C *27/80*

U.S. Cl. 416—40 **7 Claims**



1. An analog mixer adapted to be used with the controls of a helicopter rotor to vary phase angle thereof comprising:

A. a swashplate assembly mounted concentrically about a first axis for tilting motion about all tilting axes intersecting said first axis and lying in a plane normal thereto and including:

1. a nonrotatable member mounted to be tiltable about one of said tilting axes so that its tilting motion may be utilized to supply control inputs to a helicopter control, and to be restrained from rotating about said first axis, and

2. a rotatable member mounted to be tiltable with the said nonrotatable member, and to be rotatable about said first axis,

B. control input means adapted to provide control tilt creating inputs to said rotatable member at two azimuth stations separated by 90° and including:

1. first control means including a final link member having a first end connected to one such station of said rotatable member and a second end mounted for control motion along said first axis only so that uncoupled tilting motion will be imparted thereby to said swashplate assembly about a first of said tilting axes, and

2. second control means including a final link member having a first end connected to the other of said stations of said rotatable member and a second end mounted for control motion along said first axis only, so that uncoupled tilting motion will be imparted thereby to said swashplate assembly about a second of said tilting axes normal to said first of said tilting axes, and

C. means to cause said rotatable member to rotate about said first axis to thereby vary the azimuth location of said two stations and hence the first and second of said tilting axes about which said first and second control means cause said swashplate assembly to tilt.

4,028,000

BLADE CONNECTION FOR HELICOPTER ROTOR BLADES

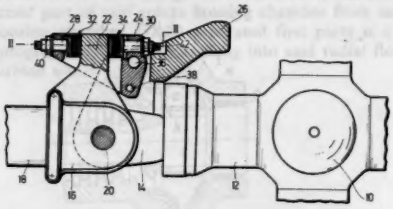
Emil Weiland, Hohenbrunn; Alois Schwarz, Putzbrunn, and Hubert Frommlet, Munich, all of Germany, assignors to Messerschmitt-Bolkow-Blohm GmbH, Munich, Germany

Filed Oct. 31, 1975, Ser. No. 627,702

Claims priority, application Germany, Nov. 8, 1974, 2452974

Int. Cl.² B64C *27/42*

U.S. Cl. 416—107 **9 Claims**



1. In a blade connection for helicopter rotor blades, comprising a blade fastening pin and a damped connection between a blade mounting member and a rotor hub, the improvement comprising a shoulder secured on said blade mounting member, a carrier bracket secured on said rotor hub and supporting two oppositely oriented adjustable pressure screws adjustable toward and away from one another in direction of rotation around the axis of said blade fastening pin and elastomeric dampers inserted between said shoulder and said pressure screws.

4,028,001

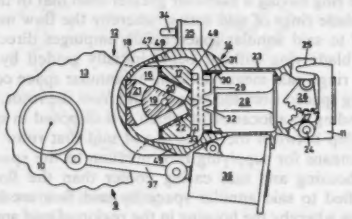
ROTOR FOR ROTARY WING AIRCRAFT

Kenneth Watson, Yeovil, England, assignor to Westland Aircraft Limited, Yeovil, England

Filed July 28, 1975, Ser. No. 599,785

Int. Cl.² B64C *27/38*

U.S. Cl. 416—134 A **18 Claims**



1. For a rotary wing aircraft a rotor including a hub arranged for rotation about a generally vertical axis and supporting a plurality of rotor blades, the rotor hub comprising, in combination,

a central portion,

a plurality of connecting arms extending radially from the central portion, each including first and second parts,

each first part comprising a pair of outwardly extending opposed plates and a joining member connecting the opposed plates to define therewith a cavity,

an elastomeric bearing means located on the radial inner side of the joining means,

each second part including a U-shaped radial inner part with the bottom of the U passing through said cavity and connected to the radial inner side of said elastomeric bearing and the legs of the U extending radially outwardly beyond said joining member, a pivot means on the second part radially outwardly of the joining member for attach-

ing a rotor blade to permit folding of the rotor blade in a generally horizontal plane about said pivot axis,

and a locking means operable between the first and second parts for locking said first and second parts against movement relative to each other and for clamping in compression the said elastomeric bearing.

4,028,002

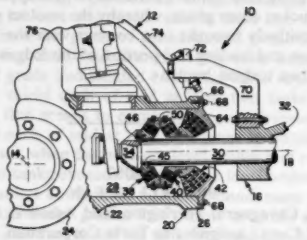
ROTOR BLADE RETENTION SYSTEM

Robert H. Finney, and Warren E. Schmidt, both of Erie, Pa., assignors to Lord Corporation, Erie, Pa.

Filed Mar. 1, 1976, Ser. No. 662,476

Int. Cl.² B64C *27/38*

U.S. Cl. 416—134 A **8 Claims**



1. A rotor blade retention system for connecting at least one elongated rotor blade to a rotor hub that is rotatable about a central axis, the connected rotor blade normally extending generally radially from the hub and being rotatable with the hub about its central axis, said retention system comprising

means carried by the rotor blade defining a first mounting surface which is oriented transversely to a longitudinal axis of the rotor blade and which faces generally outwardly relative to the central axis of the rotor hub,

means carried by the rotor hub defining a second mounting surface which is oriented transversely to the longitudinal axis of the rotor blade, the second mounting surface being spaced from the first mounting surface and facing generally inwardly relative to the central axis of the rotor hub,

at least three laminated elastomeric bearings connected together in serial compression load transmitting relationship with each other, each laminated bearing including a plurality of alternating and bonded together layers of elastomeric material and substantially inextensible material, each layer of each of the serially interconnected laminated bearings being at least partially inclined relative to the longitudinal axis of the rotor blade and having in section taken radially of the longitudinal axis of the rotor blade at least a portion projecting longitudinally toward an end of the rotor blade, the bearings being mounted to extend between the first and second mounting surfaces so as to restrain through compression loading of each of the bearings the rotor blade against centrifugal loads imposed on the blade during rotation of the blade and the rotor hub.

4,028,003

TORSIONALLY COMPLIANT HELICOPTER ROTOR BLADE WITH IMPROVED STABILITY AND PERFORMANCE CHARACTERISTICS

Timothy A. Krauss, Sandyhook, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Apr. 12, 1976, Ser. No. 675,664

Int. Cl.² B64C *27/44*

U.S. Cl. 416—141 **9 Claims**

1. A helicopter blade having:

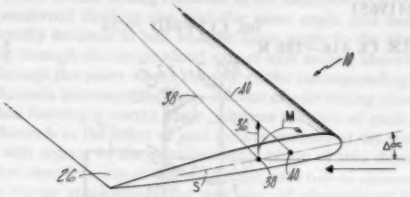
1. a root portion,

2. a tip portion,

3. an airfoil portion therebetween,

4. said tip portion being torsionally flexible and said root portion being substantially torsionally inflexible,

5. said root portion being shaped so that the locus of shear centers and the locus of centers of lift at the root portion sections are substantially coincident, and



6. said tip portion being shaped so that the locus of shear centers is forward of the locus of centers of lift at the tip portion sections to thereby establish an aerodynamic restoring moment in response to blade tip portion torsional excursions due to aerodynamically imposed tip portion loads thereby establishing improved blade torsional stability.

4,028,004

FEATHERING CONTROLLABLE PITCH PROPELLER

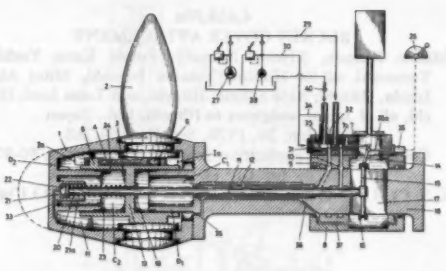
Jaap Wind, Waalwijk, Netherlands, assignor to Lips B.V., Drunen, Netherlands

Filed July 1, 1975, Ser. No. 592,261

Claims priority, application United Kingdom, July 3, 1974, 29494/74

Int. Cl.² B63H *3/08*

U.S. Cl. 416—157 R **5 Claims**



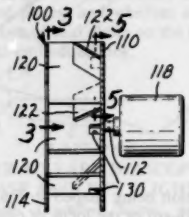
1. A controllable-pitch marine propeller having blades carried by a hub and having a hydraulic actuator housed in the hub and coupled to the blades for altering the blade pitch angle in both directions, and a servo control system for controlling the actuator to adjust the blade pitch angle, the control system having a blade position feedback loop by which the system operates with positional feedback over the range of pitch angle between astern and fullahead pitch angles, and means to render the feedback loop inoperative in response to a demand signal for blade feathering whereby the actuator then moves the blades into the feathering position without feedback action in response to the said demand signal, said feedback loop including a mechanical link constituted by a fluid supply pipe longitudinally-movably mounted in a bore in the propeller shaft, to supply pressure fluid to the actuator, the oil supply pipe having an end stop arranged to engage a fixed abutment to render the feedback loop inoperative when the actuator adjusts the blade pitch angle beyond the full-ahead position.

4,028,005

IMPELLER BLADE REINFORCEMENT

Bruno Eck, Geisbergstrasse 24, 5 Cologne 41 Klettenberg, Germany

Filed Apr. 16, 1975, Ser. No. 568,406
Claims priority, application Germany, Apr. 24, 1974, 2419651
Int. Cl.² F04D 29/24
U.S. Cl. 416—186 R 5 Claims



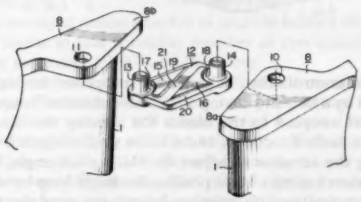
1. A centrifugal impeller having sides consisting of a circular hub disk and an annular inlet ring, impeller blades, and gusset plates attached to said blades in the space between each blade and the adjacent trailing blade, said impeller blades being securely attached to said hub disk and said inlet ring at their ends and having pressure sides and suction sides and further having inner leading inlet edges and outer trailing outlet edges, one said gusset plate being attached along one edge to the suction side of each said impeller blade from the outer trailing edge thereof along a line at right angles to said trailing edge of said blade, said line being not closer than one fourth the distance between said hub disk and said inlet ring from either end of said blade; said gusset plate being attached to said blade at an acute angle to said impeller blade so that the edge of said gusset plate opposite the edge attached to said impeller blade is attached to a side of said impeller.

4,028,006

BUCKET COVER ATTACHMENT

Michio Kuroda; Kiyoshi Namura; Fumio Kato; Yoshiaki Yamazaki, all of Hitachi; Tutomu Iwasaki, Mito; Akira Ishida, Hitachi; Akio Sohma, Hitachi, and Tetsu Imai, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 20, 1976, Ser. No. 650,768
Claims priority, application Japan, Jan. 24, 1975, 50-9772
Int. Cl.² F01D 5/22
U.S. Cl. 416—191 13 Claims



1. A bucket cover attachment for turbine buckets annularly arranged around a rotor to constitute a turbine bucket wheel for a steam turbine, such bucket cover attachment comprising:

a plurality of ledges, each provided at the upper end of one of said plurality of turbine buckets and disposed at right angles to an outer surface of the turbine bucket; and

a plurality of bucket cover pieces, each interposed between ends of the adjacent two turbine buckets;

wherein the improvement comprises a leading end portion and a trailing end portion formed in each said ledge and extending in opposite directions on both sides of the turbine bucket,

a plurality of vertical holes formed in said leading end portion and said trailing end portion of the ledge,

a plurality of cylindrical projections formed on an upper surface of said bucket cover piece and adapted to be loosely received in the vertical holes formed in the ledges of the adjacent two turbine buckets, at least one of said projections being formed at its upper end with an enlarged diameter projection portion so that the bucket cover piece may be held in place by the turbine buckets,

contact surfaces formed on the upper surface of said bucket cover piece and adapted to come into contact with the ledges of the adjacent two turbine buckets, and

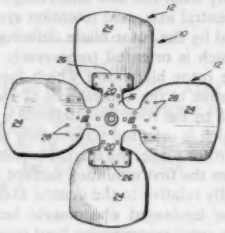
a groove interposed between said cylindrical projections for separating said contact surfaces on the upper surface of the bucket cover piece, whereby the contact surfaces can be positively brought into contact with the trailing end portion and leading end portion of the ledges of the adjacent two turbine buckets.

4,028,007

PROPELLER FAN

Erman V. Cavagnero, Torrington, and Ashok Z. Patel, Avon, both of Conn., assignors to Torin Corporation, Torrington, Conn.

Filed Aug. 18, 1975, Ser. No. 605,765
Int. Cl.² F04D 29/34
U.S. Cl. 416—212 R 10 Claims



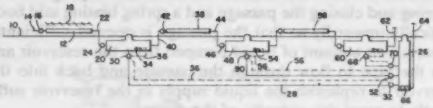
1. A propeller fan comprising a pair of similar spider-blade members each having a substantially flat central hub section, two substantially right angularly arranged pairs of narrow radially outwardly projecting spider arms, each arm being integral with the hub section at a radially inner end portion and each arm being twisted at an intermediate portion so that radially outer end portions of the arms of each pair are inclined in opposite directions relative to the hub section, a pair of air moving blades integral at inner end portions respectively with the outer end portions of the spider arms of one of said pairs of arms, and a pair of laterally projecting blade support members integral respectively with said outer end portions of said other pair of spider arms; each spider arm having a length at least one-half its width, each lateral blade support member having a width at least 50 percent greater than each spider arm, each blade having a width at least twice the width of each spider arm, and each blade having a width at least one-third its length, and said two spider-blade members being right angularly arranged with their hub sections and spider arms in contiguous face-to-face relationship and with the lateral support members of one member in face-to-face engagement with and supporting inner end portions of the blades of the other member, and means fastening said hub sections, spider arms, support members and blades together, and all of said blades when so assembled having their pitch angles provided by the associated twisted arms with no deformation and no substantial change in pitch occurring throughout the length of the blades.

4,028,008

SOLAR ENERGY OPERATED AIR COMPRESSOR

Herbert P. Shelton, 4832 Martin St., Alexandria, Va. 22312

Filed June 18, 1976, Ser. No. 697,417
Int. Cl.² F04B 19/24
U.S. Cl. 417—52 9 Claims



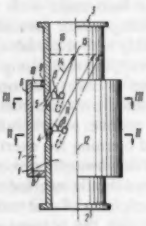
1. A solar energy operated air compressor and condenser comprising at least two tanks, said at least two tanks being disposed above the grade of the earth and to the sun's rays, a first receiving tank, said first receiving tank being disposed below said grade and shilded from said sun's rays, means to alternately shield each of said at least two tanks from said sun's rays, first means to communicate compressed air from within said each of said at least two tanks to within said first receiving tank when the pressure level within said each of said at least two tanks exceeds the pressure level within said first receiving tank, a condensate tank, said condensate tank being disposed below said grade, first means to drain condensate water from said first receiving tank into said condensate tank when said condensate water reaches a pre-determined level within said first receiving tank, a first heating tank, said first heating tank being disposed above said grade and to said sun's rays, second means to communicate compressed air from within said first receiving tank to within said first heating tank when said pressure level within said first receiving tank exceeds the pressure level within said first heating tank, a second receiving tank, said second receiving tank being disposed below said grade and shielded from said sun's rays, third means to communicate said compressed air within said first heating tank to within said second receiving tank when said pressure level within said first heating tank exceeds the pressure level within said second receiving tank, second means to drain condensate water from said second receiving tank into said condensate tank when said condensate water within said second receiving tank reaches a pre-determined height within said second receiving tank, means to supply atmospheric air to within said each of said at least two tanks.

4,028,009

JET PUMP

Nikolai Vasilievich Gudzenko, ulitsa Krasnolimanskaya, 35, kv. 1; Mikhail Efimovich Zaichenko, ulitsa Saljutnaya, 21, kv. 47, and Konstantin Leonidovich Larin, ulitsa Arsenalnaya, 15, kv. 9, all of Kiev, U.S.S.R.

Filed Sept. 24, 1975, Ser. No. 616,398
Int. Cl.² F04F 5/22
U.S. Cl. 417—163 15 Claims



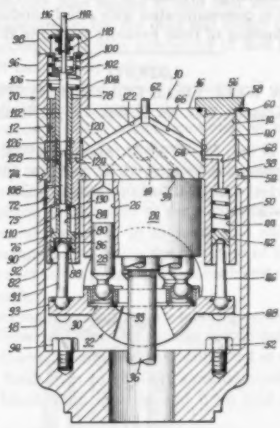
1. A jet pump having inlet and outlet ends comprising: a walled mixing chamber; through channels made in the walls of said mixing chamber for delivering a conveying fluid into said mixing chamber, said through channels being inclined along the movement of the transferred fluid, said through channels being arranged in said walls of said mixing chamber in at least two circular rows arranged one following the other in the direction of the transferred fluid, the axis of each of said channels in one of said rows being inclined to the cross-sectional plane of said mixing chamber in the direction of flow of the transferred fluid at one and the same angle and being additionally inclined at one and the same angle to the plane passing through the longitudinal axis of said mixing chamber and through the point where the axis of the corresponding of said channels intersects the outer surface of said mixing chamber, thus forming a vortex stage, whereas the axis of each of said channels in the other of said rows is inclined at the same angle with repect to the cross-sectional plane of said mixing chamber, thus forming an injecting stage, said row of channels of the vortex stage preceding said row of channels of the injecting stage along the flow of the transferred fluid, while the distance between said rows of through channels is selected in such a way that the points of intersection of said axes of the channels in said vortex stage with the inner surface of said mixing chamber and said point of intersection of said axes of channels in said injecting stage is arranged in one and the same plane perpendicular to the longitudinal axis of said mixing chamber.

4,028,010

REVERSIBLE, VARIABLE-DISPLACEMENT PISTON PUMP WITH POSITIONER MEANS FOR AUTOMATIC RETURN TO ZERO DISPLACEMENT

Donald L. Hopkins, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Continuation-in-part of Ser. No. 481,798, June 21, 1974, abandoned. This application June 20, 1975, Ser. No. 588,919
Int. Cl.² F04B 1/26; F16D 31/02
U.S. Cl. 417—217 7 Claims



1. In a reversible, variable displacement piston pump of the type having a housing including a pair of fluid passages for intake of fluid into and a discharge of fluid from said housing, a rotatable pump cylinder barrel within said housing, a plurality of pistons reciprocable within piston bores in said cylinder barrel, an angularly adjustable swash plate defining a pair of opposite ends, said swash plate being pivotally mounted intermediate said opposite ends, for determining piston displacement and thereby the amount of fluid discharged from the pump, a first servo mechanism in said housing for rotating said swash plate through a central, zero displacement position for discharge of pressurized fluid in one direction against a load, a second servo mechanism in said housing for rotating said swash plate in the opposite direction through said central, zero

displacement position for discharge of pressurized fluid in the reverse direction against a load, zero displacement positioner means for automatically returning said swash plate to a central, zero displacement position to thereby discontinue the pumping action of the pump if pump discharge pressure is lost, wherein said zero displacement positioner means comprises a first piston means within said first servo mechanism and first spring means within said first servo mechanism biasing said first piston means against one end of said swash plate, wherein said first servo mechanism comprises a first servo housing having an axial bore therethrough and said first piston means comprises a tubular sleeve slidably fitted within said axial bore and a first piston on one end of said sleeve and slidably contained within a first chamber contained within the first servo housing, the bore of the tubular sleeve being connected with the first chamber by passage means, and further comprising valve spool means movably mounted within the bore of the tubular sleeve for selective blocking and unblocking of the passage means, and a second piston means within said second servo mechanism and second spring means within said second servo mechanism biasing said second piston means against the opposite end of said swash plate, wherein said second servo mechanism comprises a second servo housing and said second piston means comprises a second piston slidably contained within a second chamber within said second servo housing, and further including means supplying pump discharge pressure (i) to said first chamber through the tubular sleeve, and (ii) to the second chamber to power the servo mechanisms to tilt and swash plate away from said central, zero displacement position, and further including auxiliary fluid pressure generating means for providing fluid pressure (i) to said first chamber through the tubular sleeve, and (ii) to the second chamber to power said servo mechanisms and to initially tilt said swash plate away from said central, zero displacement position, the auxiliary fluid pressure generating means ceasing operation upon establishment of pump pressure, and means for providing unblocking of the passage means by the valve spool means when pump discharge pressure is lost, for providing that the first chamber is communicated with relief conduit means for providing unloading of fluid pressure from the first chamber.

4,028,011

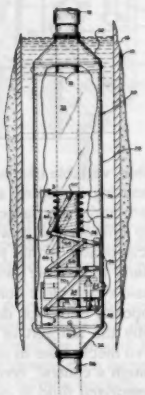
LOW WELL YIELD CONTROL SYSTEM

Richard W. Kramer, R.D. No. 2, Box 490 B, Northumberland, Pa. 17857

Continuation of Ser. No. 472,133, May 22, 1974, abandoned. This application Sept. 3, 1975, Ser. No. 610,064

Int. Cl.[2] F04B *49/00;* **F01B** *25/00*

U.S. Cl. 417—278 **10 Claims**



1. A control system for preventing overpumping liquid from a reservoir of liquid by a pump having an inlet located in the liquid and a pipe extending from the pump for removing liquid from the reservoir, the control system comprising a member defining a passage communicating the interior of the pipe with the reservoir, a valve in the passage operable to open and close the passage, a body vertically moveable in response to change in the level of the liquid in the reservoir operatively connected to the valve to actuate the same for progressively opening and closing the passage and a spring biasing said body vertically upwardly so that the passage is opened sufficiently to permit an amount of liquid pumped from the reservoir and into the pipe to flow through the passage and back into the reservoir to replenish the liquid supply in the reservoir sufficiently to meet the capacity of the pump.

4,028,012

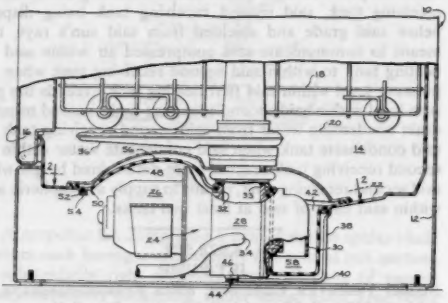
SEALING MEANS FOR A DISHWASHER TUB AND MOTOR ASSEMBLY

Donald S. Cushing, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed June 2, 1975, Ser. No. 582,662

Int. Cl.[2] F04B *17/00;* **F16J** *15/06*

U.S. Cl. 417—360 **4 Claims**



1. In a dishwasher having an internal wash chamber including a bottom wall with an opening therethrough, the improvement comprising:

a motor-pump assembly disposed within the opening and partially projecting above the level of the bottom wall;

rigid support means associated with the bottom wall for supporting the pump-motor assembly in a removably attached relationship with the wash chamber bottom wall;

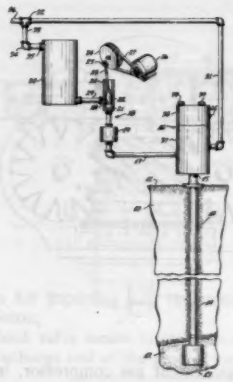
a resilient shroud overlying said pump-motor assembly and preselectively sized to cover said opening;

sealing means associated with said bottom wall including an upwardly facing groove peripherally positioned at the outer edge of said opening for exerting a clamping force radially against a downwardly directed bead member of said resilient shroud that is inserted therein for compressibly sealing the periphery of said resilient shroud in fluid-tight relationship with the bottom wall of said tub, said bead being installed into the groove from within the wash chamber, said groove being preselectively sized, as compared to the size of the bead, when uncompressed, to be in a ratio of four to five, thereby accommodating thermal expansion of said groove without disturbing the integrity of said seal.

4,028,013
PULSE MULTIPLIER FOR SURFACE OPERATED SINGLE TUBE PUMP

Arthur P. Bentley, P.O. Box 88, Arizona City, Ariz. 85223

Filed Nov. 13, 1975, Ser. No. 631,726
Int. Cl.² F04B 9/10
U.S. Cl. 417—390 7 Claims

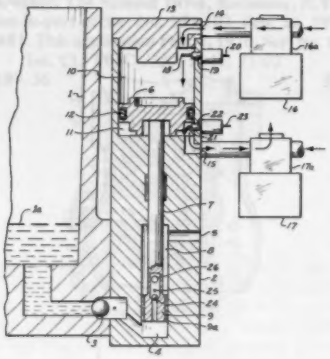


1. In a single tube surface operated pump including
a. an underground pump that is operated by pulses on a column of the liquid being pumped,
b. a tube extending from said pump to a ground surface and containing said column of liquid,
c. a receiving tank at said ground surface, and
d. a pulse generator comprising:
I. a cylinder having a lateral port communicating with said receiving tank,
II. a piston reciprocal in said cylinder, and
III. power means for reciprocating said piston,
a pulse multiplier for increasing the pulses created by said generator which are effective on said column of liquid, said pulse multiplier being connected at one side to the lower end of said cylinder, at the other side to said receiving tank and comprising:
e. a casing having a bore one end of which is connected to the upper end of said tube,
f. a first lateral port in said casing to which a conduit from the end of said cylinder is connected,
g. a second lateral port in said casing and connected to a conduit from said receiving tank,
h. a piston reciprocal in said casing,
i. a spring in said casing biasing said piston into a position in which there is a direct flow of the liquid of said column from said first lateral port to said cylinder under the influence of said underground pump which is operated by pulses created by said pulse generator,
j. surfaces on said piston in the casing which are exposed to gas pockets in said column of liquid and tending to displace said piston from its position providing said direct flow, and
k. a yieldable detent holding said piston in said position until the pressure of said gas pockets on said piston surface reaches a predetermined degree,
whereupon said detent yields and said piston in said casing is moved by gas pressure into a position in which a portion of the liquid from said column is diverted to the second lateral port and is delivered to said receiving tank, said diverted liquid entraining gas in said casing and thereby relieving the gas pressure to permit said spring to return the piston in said casing into its position providing said direct flow of liquid.

4,028,014
REVERSING MEANS FOR DOUBLE-ACTING FLUID PUMP

Eric H. Cocks, 4100 Galt Ocean Drive, Fort Lauderdale, Fla. 33308

Filed June 18, 1975, Ser. No. 587,977
Int. Cl.² F04B 9/10
U.S. Cl. 417—403 1 Claim

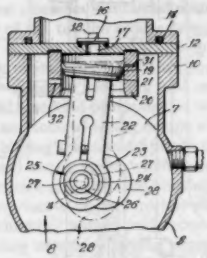


1. A reversible pump comprising
a pump housing,
a first fluid cavity within said pump housing containing a reciprocable piston dividing said first cavity into first and second portions,
first and second port means in said first and second portions, respectively, for the inlet and outlet of fluid,
first and second fluid lines connected to said first and second port means, respectively,
first and second switch means mounted in said first and second fluid lines, respectively,
first and second switch means mounted in said first and second first fluid cavity portions,
said first and second switch means being positioned within their respective cavity portions to be actuated by said piston at each end of the reciprocating path,
control means connected to said solenoid valves and said switch means for reversing the direction of fluid flow and piston travel as the piston reaches each end of its reciprocating path,
said control means comprising a latching relay actuated by signals from said first and second switch means,
third and fourth solenoid valves connected in said first and second fluid lines to shut-off simultaneously and completely block fluid flow to and from said reciprocable piston,
a second fluid cavity within said pump housing having an inlet and an outlet port,
a first check valve in said inlet port to block said inlet port during the pressure stroke,
a double-acting, fluid piston connected to said reciprocable piston and forming a portion of said second fluid cavity, and
a second check valve in said fluid piston to block off said second fluid cavity from said outlet port during the suction stroke,
whereby reciprocating movement of said reciprocable piston causes said fluid piston to produce a pumping action to draw fluid into said second fluid cavity through said outlet port.

4,028,015
UNLOADER FOR AIR COMPRESSOR WITH WOBBLE PISTON

Thomas Robert Hetzel, Sheboygan, Wis., assignor to Thomas Industries, Inc., Sheboygan, Wis.

Filed Nov. 3, 1975, Ser. No. 627,856
Int. Cl.² F04B 17/00
U.S. Cl. 417—415 7 Claims

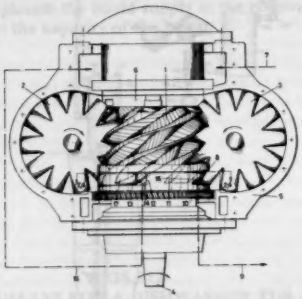


1. A compressor of the wobble piston type comprising:
a hollow, vertically extending frame open at the top and having an upwardly facing rim;
a transverse cylinder head plate extending across the top of said frame and being clamped onto said rim;
a downwardly opening vertically extending cylinder attached to and downwardly extending from the lower surface of said head plate;
an inverted cup-shaped discharge chamber having its rim clamped to the rim of the top surface of said head plate;
a discharge passageway extending through said heat plate from within said cylinder to the inside of said discharge chamber;
a check valve within said passageway to permit flow from said cylinder to said discharge chamber;
a wobble piston fitting in said cylinder;
a crank shaft journaled in said frame and carrying a crank pin;
a piston rod rigidly connected at one end to said wobble piston and connected at its other end through a crank pin bearing to said crank pin, rotation of said crank shaft driving said wobble piston so that on its downstroke from the top center position one side of the wobble piston descends more rapidly than the other;
a bleed hole extending through the side wall of said cylinder to continuously connect the interior of said cylinder to atmosphere, said bleed hole being adjacent the upper end of the cylinder and so located as to be uncovered by said piston substantially at the beginning of said downstroke; and
an intake port extending through the side wall of said cylinder at the lower end thereof said bleed hole and said port being overrun in succession to permit the successive entry of air into said cylinder above the piston during the downward stroke of the piston, said bleed hole being substantially smaller in diameter than said intake port to relieve the suction which occurs near the beginning of a downward stroke of said piston without substantially affectng the efficiency of said compressor.

4,028,016
ROTARY DISPLACEMENT COMPRESSOR WITH CAPACITY CONTROL

Jan T. Keijer, Rosmalen, Netherlands, assignor to Grasso's Koninklijke Machinefabrieken N.V., s-Hertogenbosch, Netherlands

Filed Dec. 31, 1975, Ser. No. 645,815
Claims priority, application Netherlands, Jan. 31, 1975, 7501187
Int. Cl.² F04B 49/02; F01C 21/12, 1/08; F04C 29/08
U.S. Cl. 417—440 5 Claims



1. In a rotary displacement gas compressor, including a single driven cylindrical rotor provided with spirally-extending grooves, at least two gears having teeth in sealing engagement with said grooves, the axis of rotation of each being perpendicular to a plane passing through the axis of rotation of said rotor, a close-fitting cylindrical casing enclosing said rotor and part of each gear, each gear traversing the wall of said casing, the gas to be compressed being drawn in through the open ends of the grooves at one head end of the rotor, for each gear an exhaust port in the wall of the casing near the other head end of the rotor, seen in the direction of rotation of the rotor in front of the gear, and a pressure pipe connected to each exhaust port, the improvement comprising: for each gear a return port in the wall of the casing at the same axial height as said exhaust ports; a return pipe connecting each return port with the intake side of the compressor; and a single rotatable regulating ring rotating with respect to said casing to control the size of said return ports from a completely closed position to a maximum open position while simultaneously adjusting the size of the exhaust ports in the reverse sense, said regulating ring comprising a fully circular element rotating relative to said casing and having side flaps in the same number as gears, one regulating edge of each side flap adjusting an exhaust port and the other regulating edge adjusting a return port.

4,028,017
MANURE PUMP HAVING AGITATOR PISTON

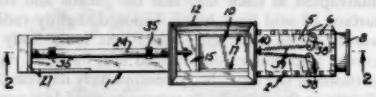
Gerald F. Kobiske, Loyal, Wis., assignor to Kobiske Industries, Inc., Loyal, Wis.

Filed Mar. 26, 1976, Ser. No. 670,753
Int. Cl.² F04B 7/04
U.S. Cl. 417—489 5 Claims

1. A manure pump comprising:
a. a supply hopper having an open bottom;
b. a generally horizontally extending housing having one end supporting said hopper and defining an open topped chamber in register with the open bottom of said hopper and a generally horizontal discharge passageway leading from said chamber and having a discharge end portion;
c. a piston reciprocably movable in said chamber and passageway and having a generally flat pumping surface facing said discharge end portion of the passageway said pumping surface being disposed in a plane normal to the

direction of movement of the piston, and an opposite material mixing surface angularly displaced from said plane and sloping upwardly toward said pumping surface;

d. guide means guiding said piston for reciprocatory pumping and return movements in said chamber and said passageway;



e. means for imparting said reciprocatory movements to said piston;

f. and check valve means in said housing normally closing said discharge end of the passageway.

4,028,018
NON-PULSING APPARATUS

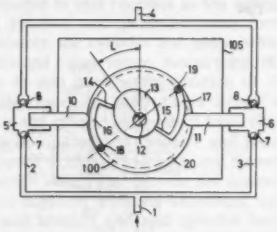
Alan Keith Audsley, Winchester, England, assignor to Paterson Candy International Limited, London, England

Filed June 6, 1975, Ser. No. 584,467

Claims priority, application United Kingdom, June 10, 1974, 25732/74

Int. Cl.² F04B *21/04*

U.S. Cl. 417—534 **2 Claims**



1. Pumping apparatus suitable for pumping chemical fluids comprising a plurality of flowpaths extending between a fluid inlet and a fluid outlet, an identical reciprocating pump in each flow path, a housing between the pumps, a pump reciprocating member for each pump extending outwardly through said housing in sealing relation therewith, a respective cam follower device in said housing for each pump reciprocating member and in constant engagement therewith, continuously rotatable cam means in said housing constantly engaging said cam follower devices for actuating them and being shaped to provide a substantially constant pumped volume from said pumping apparatus, and pivotable carrier means in said housing, each cam follower device including an arm pivotably mounted at one end on said carrier means and a cam follower at the other end engaging said rotatable cam means, each arm having a convexly-curved surface engaging the pump reciprocating member of the respective pump, said carrier means being rotatable on the same axis as said rotatable cam means for altering the stroke of each pump when said carrier means is turned on said axis but still maintaining the pumped volume of said apparatus substantially constant, the pivotal mountings of the arms on the carrier means being arranged on a common circle, and the arms lying on the circle at maximum discharge of the pumps irrespective of the pivoting of the carrier means and being movable radially inwardly only of the circle.

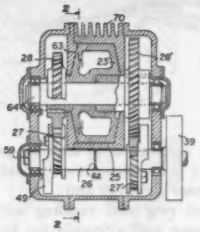
4,028,019
POSITIVE-DISPLACEMENT UNIT WITH COAXIAL ROTORS

Ernest Wildhaber, 124 Summit Drive, Rochester, N.Y. 14620

Continuation-in-part of Ser. No. 551,102, Feb. 20, 1975, Pat. No. 4,003,681. This application Feb. 4, 1976, Ser. No. 655,161

Int. Cl.² F01C *1/00*; F16H *35/02*

U.S. Cl. 418—36 **5 Claims**



1. A rotary unit for positive displacement of fluid having two coaxial rotors whose arms project outwardly from their axis inside of a housing,

a shaft offset from the rotor axis for transmission of motion between said rotors and the outside,

a pair of varying-motion gears directly connecting said shaft with one of the rotors,

another pair of varying-motion gears of opposite phase directly connecting said shaft with the other rotor, to achieve spaces of varying volume between said arms, wherein

the gear pitch-lines that roll on each other without slippage differ on the two gears of each pair, and intersect the pitch circles of a pair of imaginary uniform-motion gears coaxial therewith and of the same tooth ratio,

the pitch line of said gear on each rotor contains two diametrically opposite maximum radii and perpendicular thereto two minimum radii, is convex throughout, and projects outwardly of said pitch circle more than it recedes inwardly thereof,

having a smaller radius of curvature at the two maximum radii than an ellipse of the same maximum and minimum radii,

the tooth profiles are equally spaced along said pitch lines and have a constant inclination thereto,

and the tooth profiles have curvature radii varying with the curvature radii of the pitch curves.

4,028,020
OIL SEAL FOR A ROTARY ENGINE

James A. Ritchie, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 8, 1975, Ser. No. 611,038

Int. Cl.² F01C *19/08*

U.S. Cl. 418—51 **3 Claims**

1. In a slant axis rotary mechanism, the combination comprising:

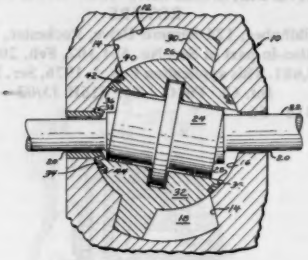
a housing;

a rotor having spherical hub with an axial bore and within said housing;

a shaft journalled in said housing and having an angularly offset portion received in said bore and journalling said rotor;

said rotor hub having a pair of annular seal receiving

grooves, said grooves being at opposite ends of said rotor hub and surrounding said bore, each of said grooves having a bottom, a radially inner sidewall and a radially outer sidewall, each of said grooves having a cross-sectional configuration such that the radius measured in a plane transverse to said axial bore of any interior portion



of said inner sidewall is at least as great as the radius measured in a plane transverse to said axial bore of the rim of said inner sidewall; and

a unitary closed ring seal residing within each of said grooves between said sidewalls for bearing against said housing.

4,028,021

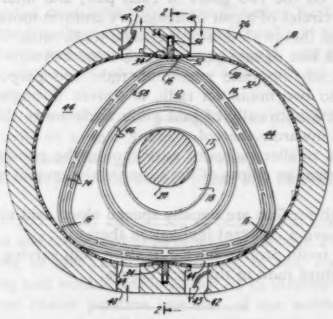
ROTARY TROCHOIDAL COMPRESSOR WITH COMPRESSIBLE SEALING

Murray Berkowitz, Woodcliff Lake, N.J., assignor to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed Dec. 8, 1975, Ser. No. 638,678

Int. Cl.² F01C *1/22, 19/00, 5/04*

U.S. Cl. 418—56 **3 Claims**



1. A rotary mechanism such as a compressor, expansion engine or the like comprising:

a. an outer body comprising a pair of axially-spaced end walls and an intermediate wall defining a cavity therebetween;

b. an inner body mounted for relative rotation within said cavity and having its axis eccentric to the axis of the outer body, the peripheral surface of said inner body being substantially a hypotrochoid with three nose portions rigid therewith and the inner peripheral surface of said intermediate wall being approximately the outer envelope of the peripheral surface of the inner body such that said intermediate wall peripheral surface has two diametrically opposed regions which generate said hypotrochoidal surface during relative rotation of said bodies and such that a plurality of fluid working chambers are formed between said inner body and said intermediate wall peripheral surface;

c. radially movable seal bar means carried by the outer body intermediate wall at each of said hypotrochoid generating regions and spring means for urging each seal bar means into continuous sealing contact with the hypotrochoid peripheral surface of the inner body;

d. said outer body having intake and outlet ports disposed on opposite sides of each said generating region; and

e. a compressible liner for the peripheral surface of said intermediate wall, said liner extending over the entire portion of said peripheral surface except said liner being interrupted at each said seal bar means and the inner surface of said liner being disposed slightly radially inwardly of the outer envelope of the inner body so that except when under one of said seal bars the rigid nose portions of the inner body continuously depress the liner slightly as the inner body rotates to provide a continuous seal between said nose portions and the liner in all positions of the inner body, said liner comprising a radially flexible base portion and having a flexible sheet-like layer over the inner surface of said base portion for sliding contact with the rigid nose portions of the inner body.

4,028,022

OIL SEAL ASSEMBLY

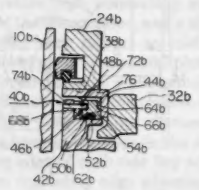
Hiroshi Takeuchi, Tokyo; Toshitugu Ishizawa, Higashi-Murayama; Tetuyuki Yamano, Kodaira; Ko Chiba, and Daisaku Kobayashi, both of Kashiwazaki, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama and Riken Piston Ring Kogyo Kabushiki Kaisha, Tokyo, both of, Japan

Division of Ser. No. 398,784, Sept. 19, 1973, abandoned. This application May 16, 1975, Ser. No. 578,128

Claims priority, application Japan, Sept. 20, 1972, 47-109358

Int. Cl.² F01C *19/12*

U.S. Cl. 418—104 **7 Claims**



1. In a rotary piston internal combustion engine having a rotor journalled on an eccentric portion of an engine shaft, an oil sealing arrangement comprising:

a first disc connected to the engine shaft and having a first radially extending annular face which is in rotatable unison with the engine shaft;

a second disc connected to the rotor and having a second radially extending annular face which is in rotatable unison with the rotor, said second face being spaced from and facing with said first face;

a sealing ring disposed between said first and second faces, said sealing ring having a surface adapted to engage with the adjacent one of said first and second faces;

a spring disposed between the other one of said first and second faces and said sealing ring to be compressed therebetween to bias said sealing ring away from said other face to sealingly engage said surface of said sealing ring with said one face; one

an O-ring sealing disposed between said sealing ring and that one of said first and second discs which has said other face and.

4,028,023

FLUID OPERABLE ROTARY PISTON DEVICE

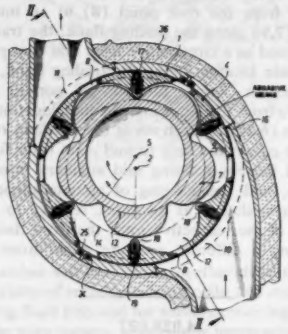
Herwig Labus, Julich, Germany, assignor to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Germany

Filed Nov. 26, 1975, Ser. No. 635,661

Claims priority, application Germany, Nov. 28, 1974, 2456252

Int. Cl.² F01C *1/10, 19/04, 21/10*

U.S. Cl. 418—108 7 Claims



1. In a fluid operable rotary piston device; a housing including means forming a cylindrical chamber therein with gas inlet and gas outlet means, a hollow cylinder rotatable on the central axis thereof in said chamber with radial clearance and having gas openings which communicate with said inlet and outlet means as said cylinder rotates in said chamber, a piston eccentrically mounted in said cylinder and rotatable therein on the central axis of the piston, transmission means connecting the piston and cylinder for rotation at respective speeds, said cylinder having inwardly concave axial recesses therein and said piston having outwardly convex axial protruberances therein receivable in said recesses as the cylinder and piston rotate, said recesses and protruberances forming working chambers between the cylinder and piston which vary in size as the cylinder and piston rotate, means supporting said piston and cylinder in said housing for rotation of the piston and cylinder on the respective central axes thereof while supporting the piston and cylinder in contact free relation, and axial sealing strips on one of said cylinder and piston for sealing between adjacent working chambers, and means for adjusting the sealing strips radially to provide for contact free sealing gaps between adjacent working chambers, said cylindrical chamber is said housing and said cylinder having a contact free sealing gap between the opposed surfaces thereof, said means in the housing forming said chamber being segmented with the segments thereof being relatively adjustable to control the said gap between the gap between the cylindrical chamber and the cylinder.

4,028,024

MANUFACTURE OF FILLED CAPSULES OR THE LIKE

Stephen T. Moreland, 789 Anita Ave., Grosse Pointe Woods, Mich. 48236

Continuation-in-part of Ser. No. 519,435, Oct. 31, 1974, abandoned. This application Sept. 30, 1976, Ser. No. 728,140

Int. Cl.² B29D *31/00*

U.S. Cl. 425—133.1 25 Claims

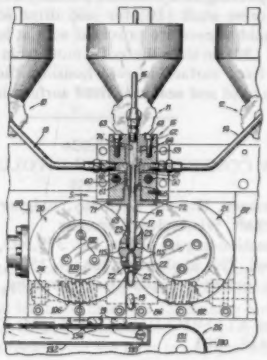
1. An apparatus for making units comprising an ingestable substance with a coating of ingestable material, said apparatus comprising:

first means forming a source of said substance in fluid form under pressure;

second means adjacent said first means forming a source of said material in fluid form under pressure;

extruder means comprising a body having a vertical passageway open at the bottom, said extruder means being connected to said first and second means for extruding a rod comprising a continuous core of said substance with a continuous coating of said material along a vertically downward path from said bottom opening;

unit molding means subsequent said extruder means for forming said rod into individual units and comprising two endless devices each positioned at a respective side of said path below said opening, each device having a surface with a sequence of half-unit-cavities therein which move past said path in a downward direction in timed relationship such that the half-unit-cavities of the two devices meet at said path to define a whole-unit-cavity, each half-unit-cavity comprising walls defining a pocket having sides and ends, each endless device being a wheel rotating about an axis and having a periphery with the half-unit-cavities therein, the peripheries of said wheels



meeting at a pinch-point on a line between said axes, each wheel including means associated with each half-unit-cavity for pushing the unit away therefrom after the wheel moves away from the pinch-point, the periphery of each wheel defining a rim surrounding the exterior of each pocket and extending radially outwardly from the portion of the wheel periphery to the outside of the rim, the rims of the wheels being in registry at the pinch-point, said molding means including means mounting one of the wheels for movement toward and away from the other wheel to adjust the pressure between the rims at the pinch-point; and

means positioned below said molding means for receiving the individual units descending by gravity from the molding means and for cooling the material, said cooling means comprising a foramenous conveyor and means operatively associated with said conveyor for directing cooling air through said conveyor.

4,028,025

SCREW PUMP

Arne Lonnebring, Alvsjo, Sweden, assignor to Aktiebolaget Imo Industre, Stockholm, Sweden

Filed Apr. 30, 1976, Ser. No. 682,164

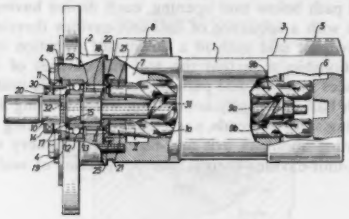
Claims priority, application Sweden, May 2, 1975, 7505141

Int. Cl.² F04C *1/10;* F16C *33/74;* F16J *15/08*

U.S. Cl. 418—197 1 Claim

1. A screw pump having a screw unit which comprises a drive screw (9*i*) and at least one impeller screw (9*b*) meshing therewith, a housing 19) sealingly enclosing said screws; said impeller screws on the pressue side of the pump being provided with pins (21) mounted in sleeves (22), the interiors of

which communicate with the suction side of the pump through channels (28, 29, 31, 32) in said pump housing and in said drive screw; to relieve axial forces on said impeller screws; a disc-like packing (35) mounted between an end surface of each sleeve and an end wall (2) of said housing which said wall closes the pressure side of said housing, through which end



wall and packing said channels partially extend, and through which a drive shaft (10) for said drive screw is extended; wherein said sleeves are provided with at least one deformation zone (39) on sides thereof remote from said packing, and facing a fixed surface in said housing, the zones being arranged to abut and seal said fixed surface in the housing.

4,028,026

SCREW COMPRESSOR WITH INVOLUTE PROFILED TEETH

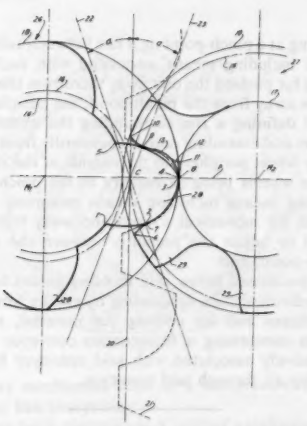
Ernst Menssen, Horren, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany

Continuation-in-part of Ser. No. 379,303, July 16, 1973, abandoned. This application June 9, 1975, Ser. No. 584,820

Claims priority, application Germany, July 14, 1972, 2234777

Int. Cl.² F01C *1/16;* **F16H** *55/04;* **F04C** *17/12*

U.S. Cl. 418—201 **1 Claim**



1. A screw compressor for the compression and axial displacement of a gas, said compressor comprising:

a housing formed with an axially extending passage having at one axial end a gas inlet and at the other axial end a gas outlet;

a one-piece main rotor extending axially in said passage and formed with a plurality of helical ribs having generally convex flanks and root regions formed at least partially as involutes in cross section, said ribs being asymmetrical with respect to the centers of said ribs, each rib of said main rotor having a profile consisting of a leading flank formed as an involute (1–2) from a point (1) at its junction with the respective root region to an intermediate location (2) along said leading flank and a circular arc (2¾) from said intermediate location (2) to a circular arc apex (3,4) of the rib, and a trailing flank (¾–5) formed as an involute from said apex (3,4) to the junction point (5) of said trailing flank with a respective root portion;

a one-piece auxiliary rotor extending axially in said passage and formed with a respective plurality of helical ribs meshing with said ribs of said main rotor and having opposite flanks, the leading flank of each rib of said auxiliary rotor being formed as a concave cycloid (8-9/7-8) from the root point (8) to an intermediate location (7,9) along the leading flank, the trailing flank being formed as a circular arc from said root point to an intermediate location along the trailing flank, and both flanks further being formed as convex involutes (6-7/9-10) from the latter intermediate locations (7,9) to the crown (6,10) of each rib at the auxiliary rotor; and

drive means connected only to said main rotor for rotating same and thereby rotating said auxiliary rotor in mesh therewith, said flanks being of arcuate shape adjacent their regions shaped as involutes, relative to a rotation direction of the respective rotor the front flanks of said ribs having a different pressure angle from the back flanks.

4,028,027

SCREW HOUSING FOR A SCREW MACHINE

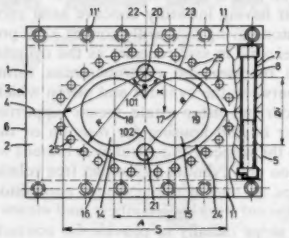
Wolfgang Wörz, Illingen, Germany, assignor to Werner & Pfleiderer, Stuttgart, Germany

Filed May 9, 1975, Ser. No. 576,019

Claims priority, application Germany, May 16, 1974, 2423785

Int. Cl.² F01C *21/10;* **B30B** *3/00;* **B29B** *1/10*

U.S. Cl. 418—201 **10 Claims**



7. A screw housing with a non-circular insert for a two-shafted screw machine, wherein the wearing insert has two spaced parallel bores to accommodate respective screw shafts, the mutually parallel longitudinal axes of the shafts lying in the principal plane of symmetry of the wearing insert, and being spaced apart to form saddles between the bores, the insert having substantially constant external cross-section along its axial length and being arranged in a cavity of the same cross-section in the screw housing, the wearing insert having an external cross-section which is bounded by at least two convex curves, while no angles are present in the external cross-section in the region of the saddles and the insert is undivided in the region of the saddles.

4,028,028

SLIDING VANE FLUID DEVICE

Francis Joseph Fuchs, Jr., Princeton Junction, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

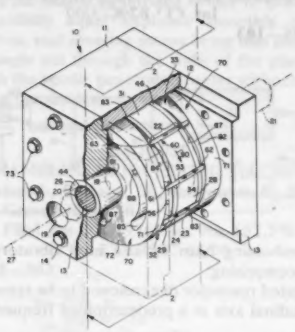
Filed Apr. 9, 1976, Ser. No. 675,439

Int. Cl.² F04C *15/02, 1/00*

U.S. Cl. 418—219 **8 Claims**

1. An improved rotary fluid device of the type having a

rotor received in a chamber defined by a chamber wall; a plurality of vanes mounted, one in each of a plurality of slots formed in the rotor, for side-to-side sliding movement in the slots in an axial direction, parallel to an axis of rotor rotation; means within the chamber for sliding the vanes from side to side in said axial direction upon rotation of the rotor; the



rotor, chamber wall and vanes together dividing the chamber into a plurality of variable volume cells; and means for serially introducing fluid into and for serially receiving fluid from the cells as the rotor rotates, wherein the improvement comprises:

means, operated by fluid pressure, for opposing the tendency of the fluid within the cells to slide the vanes in said axial direction within the slots.

4,028,029

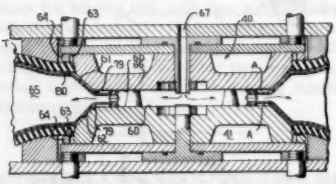
RETREADING MOLD WITH BLADDER FOR CREATING ANNULAR VACUUM GAP

Kenneth T. MacMillan, 4992 Wesleyan Woods Drive, Macon, Ga. 31204

Continuation-in-part of Ser. No. 391,816, Aug. 27, 1973, Pat. No. 3,997,284. This application Aug. 20, 1976, Ser. No. 716,206

Int. Cl.² B29H *5/04*

U.S. Cl. 425—23 **6 Claims**



1. A retreading mold comprising a pair of relatively movable platens, matrix means carried by each platen for receiving therein a tire to be retreaded, a bead aligner wheel associated with each platen, said bead aligner wheels being in axially opposed relationship to each other, each bead aligner wheel having means at a periphery for contacting a wheel bead and aligning a tire relative thereto, an annular bladder disposed between said platens, said annular bladder having innermost peripheral marginal portions, said innermost peripheral marginal portions being in overlying relationship upon said bead aligner wheels inboard of said contacting means; means for creating an annular gap between a terminal edge of each bladder peripheral marginal portion, an outboard portion of each said bladder peripheral marginal portion, and the associated bead aligner wheel, said annular gap creating means being defined by an annular axially projecting bead carried by each outboard portion of each said bladder peripheral marginal portions in sealing contact with its associated head aligner wheel, and each annular bead being positioned between said contacting means and said terminal edge.

4,028,030

INSTALLATION FOR PELLETIZING ORGANIC WASTE MATERIALS

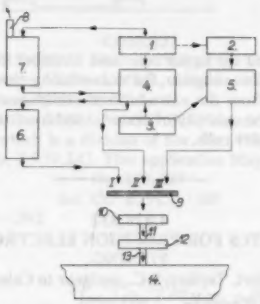
Hugo Imhof, Geneva, Switzerland, assignor to S.A.F. Societe Agricole et Fonciere S.A., Luxembourg

Division of Ser. No. 577,167, May 14, 1975. This application Aug. 5, 1976, Ser. No. 711,889

Claims priority, application Switzerland, July 3, 1974, 9140/74; Nov. 13, 1974, 15121/74

Int. Cl.² B29C *3/02*

U.S. Cl. 425—135 **10 Claims**



1. An installation for processing organic waste materials into pellets, comprising areas for storing and mixing organic waste materials, at least one chamber for passing hot dust-carrying exhaust gas through mixed and partly dried organic waste material to recuperate the heat in said gas and the dust carried thereby, at least one oven for heating mixed organic materials, means for breaking and pulverizing the mixed and partly dried organic materials, adjustable supply means for supplying the pulverized organic materials, chopping means receiving organic materials from said supply means for chopping the received organic materials, means for extruding the chopped organic materials to form strands, at least one perforated vibrating plate receiving broken strands from the extruding means, means for supplying a rising current of hot air through perforations of said plate, and at least one rest silo.

4,028,031

SCREW EXTRUDER AND CALENDER ASSEMBLAGE

Adolf Seide, Bissingen, Enz, Germany, assignor to Werner & Pfleiderer, Stuttgart-Feuerbach, Germany

Filed Dec. 8, 1975, Ser. No. 638,638

Claims priority, application Germany, Dec. 11, 1974, 2458614

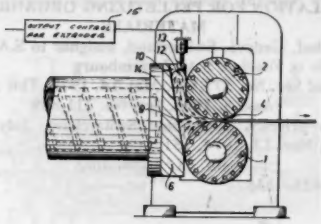
Int. Cl.² B29C *3/06*

U.S. Cl. 425—147 **6 Claims**

1. An extruder-calender assemblage for rolling out pliable material in the form of plates and foils or sheets, said assemblage comprising in combination:

a screw extruder having at one end a discharge member including an opening for discharging material to be rolled from the extruder; a calender including a pair of axially parallel and superimposed rolls mounted adjacent to the discharge member of the extruder, said calender rolls being disposed normal to the extruder and having a working gap axially aligned with the center axis of the extruder; the side of the discharge member facing the rolls in conjunction with the peripheral wall surfaces of the calender rolls defining a chamber extending across the

entire width of the feed-in gap between said rolls and to the lower end of said opening in the discharge member, the chamber being closed at its end juxtaposed to the lower roll and open at its end juxtaposed to the upper roll and increasing in crosswise width from the lower calender



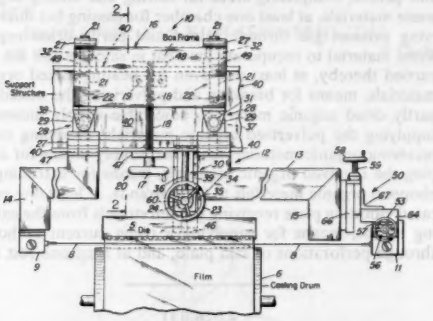
roll toward the upper one; said chamber constituting an equalization chamber for accumlating the material discharged from the extruder and compensating for variations in the quantity of material fed from the extruder to the calender rolls.

4,028,032

APPARATUS FOR PRECISION ELECTROSTATIC PINNING

Elie Loyd Hebert, Taylors, S.C., assignor to Celanese Corporation, New York, N.Y.

Filed Mar. 9, 1976, Ser. No. 665,353
Int. Cl.² B29D 7/22
U.S. Cl. 425—174.8 E 18 Claims



1. An apparatus for the precision positioning of electrostatic pinning means comprising

a frame moveable in the horizontal and vertical directions;

pinning means support means connected to said frame;

an electrostatic pinning means held by said pinning means support means;

horizontal adjusting means, connected to said frame, comprising a horizontal actuating means connected to horizontally moveable means responsive to said horizontal actuating means;

horizontal precision control means, cooperating with said horizontal adjusting means, and connecting to said moveable frame;

vertical adjusting means, connected to said frame, comprising a vertical actuating means connected to vertically moveable means responsive to said vertical actuating means; and

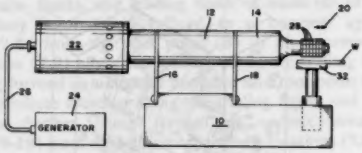
vertical precision control means, cooperating with said vertical adjusting means, and connected to said moveable means.

4,028,033

APPARATUS FOR EMBOSSING A PLASTIC WORKPIECE USING VIBRATORY ENERGY

Ronald K. Bryant, Brookfield, Conn., assignor to Branson Ultrasonics Corporation, New Canaan, Conn.

Division of Ser. No. 569,807, April 21, 1975, abandoned. This application Feb. 17, 1976, Ser. No. 658,231
Int. Cl.² B29C 3/00
U.S. Cl. 425—183 10 Claims



1. An embossing horn for use in a vibratory embossing apparatus comprising:

an elongated resonator dimensioned to be resonant along it longitudinal axis at a predetermined frequency of vibration;

a removable embossing ring having a plurality of circumferentially disposed ridges, said ridges forming a unitary part of said ring and being provided with peripherally disposed and radially extending embossing indicia, and

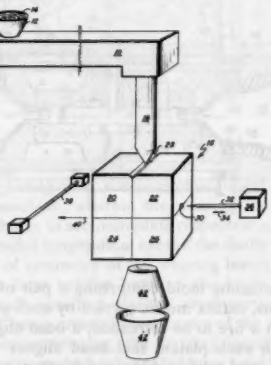
means for clamping said ring concentrically upon said resonator at or in proximity to an antinodal region of longitudinal motion of said resonator.

4,028,034

METHOD AND APPARATUS FOR BLOW MOLDING PLASTIC

Granville J. Hahn, Dallas, Tex., assignor to Cosden Oil & Chemical Company, Big Spring, Tex.

Division of Ser. No. 326,568, Jan. 24, 1973, Pat. No. 3,939,236, and a continuation-in-part of Ser. No. 81,488, Oct. 16, 1970. This application Feb. 14, 1975, Ser. No. 550,017
Int. Cl.² B29D 23/04
U.S. Cl. 425—302 B 3 Claims



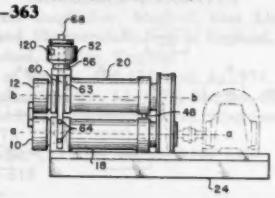
1. An apparatus for blow molding which comprises a split quadrisectional mold having an upper left mold quadrant, an upper right mold quadrant, a lower left mold quadrant and a lower right mold quadrant; said quadrants forming a mold cavity when joined; means connected to said upper mold quadrants for separately moving said upper mold quadrants relative to each other; means connected to said lower mold quadrants for separately moving said lower mold quadrants relative to each other; means connected to said upper mold quadrants for moving said upper mold quadrants relative to said lower mold quadrants; a hollow needle-like blowing

means adjacent said mold and insertable through the mold center to blow mold a foamed plastic parison in the mold cavity to the shape of the mold; and cutting means adjacent said mold and insertable between upper and lower mold sections after blow molding said parison through said needle penetrated center for smoothly severing the blow mold product through the needle penetrated center to divide the same into substantially equal duplicate smoothly cut finished molded halves, said severing means being thin and adapted to pass as a single cut through the walls of the plastic molding and through the needle penetrated center without leaving any significant scrap residue.

4,028,035
FRAMELESS BRIQUETTING MACHINE

Karl R. Komarek, Chicago, Ill., assignor to K. R. Komarek, Inc., Elk Grove Village, Ill.

Filed Jan. 27, 1976, Ser. No. 652,776
Int. Cl.² B29C *15/00*
U.S. Cl. 425—363 **21 Claims**

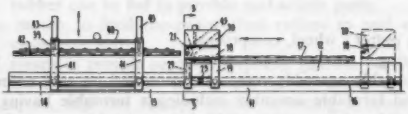


1. A press for forming briquettes of particulate material between the peripheral surfaces of a pair of rolls, comprising:
   a. a pair of elongated shafts for rotating said rolls, said shafts being substantially parallel;
   b. a pair of bearing housings for rotatably mounting said shafts, one of said bearing housings being rigidly mounted;
   c. means for pivoting the other of said bearing housings to the rigidly mounted bearing housing for rotation in the plane of said shafts, said pivoting means being located substantially midway between the axes of said shafts; and
   d. means for biasing said rolls into substantially tangential contact, said biasing means including pressure-responsive means proximate said rolls and rods slidably passing through said pivotally mounted bearing housing for connecting said rigidly mounted bearing housing to said pressure-responsive means.

4,028,036
ROTATABLE CONCRETE PROFILING MEANS

James Douglas Farfor, Brighton, Australia, assignor to Fictor Pty. Limited, Brighton, Australia

Filed June 3, 1975, Ser. No. 583,448
Claims priority, application Australia, June 3, 1974, 7747/74
Int. Cl.² B28B *3/12*
U.S. Cl. 425—374 **5 Claims**

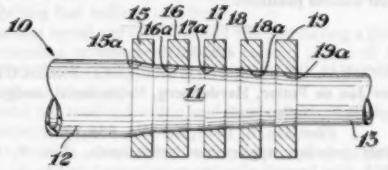


1. Means for shaping the surface of moldable material comprising a rotatable device journalized for rotation about an axis, means operatively coupled to the device for advancing the device normal to its axis of rotation along and over material to be molded whereby the surface of the material is molded by the engagement of the lower part of the peripheral surface of the device with the material, and means coupled with the said device for rotating the device about its axis of rotation in a direction counter to the direction it would rotate if rolled along the material surface in the direction of advancement so that the lower peripheral surface of the device moves in the direction of advancement and relative to the rate of advancement of the device whereby the surface of the device in engagement with the material is continuously changed and there is relative movement between the surface of the device and the material, the radius from the axis of rotation of the device, in at least some cross-sections of the device, varying in a smooth and stepless manner around the periphery of the device, said device being of circular cross-section but arranged eccentrically so that its geometric axis is spaced from the axis of rotation.

4,028,037
TUBE TREATING AND APPARATUS THEREFOR

David H. Dawson, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 559,347, March 17, 1975, abandoned, which is a division of Ser. No. 498,680, Aug. 19, 1974, Pat. No. 3,939,243. This application May 26, 1976, Ser. No. 690,227
Int. Cl.² B29C *17/00*
U.S. Cl. 425—392 **3 Claims**



1. A tube diameter reducing apparatus, the tube diameter reducing apparatus comprising in cooperative combination
   a frame, the frame having a longitudinal axis,
   a plurality of die plates supported within the frame and selectively portionable therein, the die plates each defining
   a tube receiving opening, the tube receiving opening of the die plates being of generally successively decreasing diameter, the openings of the die plates being disposed in planes generally normal to the longitudinal axis, the openings of the die plates being generally coaxially disposed,
   means to: (a) selectively position the die plates along the axis of the frame, (b) provide sequential movement of a minor portion of the die plates relative to a major portion thereof, and (c) subsequently move each of the die plates relative to a major portion of the die plates whereby a tube on having a diameter approximately the diameter of the larger tube receiving opening the tube on being passed through the openings of decreasing diameter by the movement of die plates is reduced in diameter.

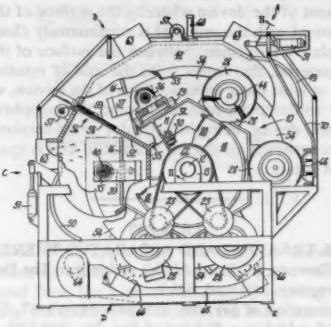
4,028,038
ROTATIONAL MOULDING MACHINES

Douglas John Haigh, Wellingborough, England, assignor to USM Corporation, Boston, Mass.

Filed Jan. 27, 1976, Ser. No. 652,766
Claims priority, application United Kingdom, Feb. 4, 1975, 4689/75
Int. Cl.² B29C *5/04*
U.S. Cl. 425—430 **10 Claims**

1. A rotational moulding machine comprising a turret mounted for rotation about a main axis, a plurality of mould carriers mounted on the turret at regular angular intervals

about the main axis, and indexing means operative to rotate the turret step-by-step about the main axis so as to bring, in indexing movements of the turret, each mould carrier in turn movable to a work station of the machine, each mould carrier being mounted for pivotal movement relative to the turret between a first position in which drive means of the machine



is operative to cause rotation of a mould mounted on the mould carrier, and a second position in which the drive means is inoperative in respect of the mould on that mould carrier, and the machine comprising independently operable clutch means whereby each mould carrier can be moved between its first and second positions.

4,028,039

REMOVAL OF INJECTION MOULDED PRODUCTS

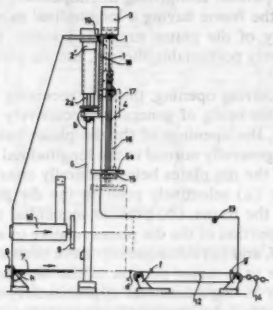
Warner Jan de Putter, Hardenberg, Netherlands, assignor to Wavin B.V., Netherlands

Filed Jan. 8, 1975, Ser. No. 539,723

Claims priority, application Netherlands, Jan. 9, 1974, 7400312

Int. Cl.² B29C *7/00*

U.S. Cl. 425—436 R **3 Claims**



1. A device for automatically removing a plastic article from the mould of an injection moulding machine having a pair of die halves, comprising a grab supported near the mould part of the machine for removing. and discharging a synthetic plastic article; means for moving said grab; said grab having a range covering the entire space formed by the open die halves; a lateral transfer and support member; means for moving said lateral transfer and support member; said transfer and support member having a range outside the operative area of the injection moulding machine for receiving said articles from the grab and discharging said articles beyond the machine; an actuating means comprising at least one moving part on the grab which sets the lateral transfer and support member into motion; the lateral transfer and support member comprising a laterally movable flat plate upon which the moulded articles are transferred externally of the machine; the range of said plate of the lateral transfer and support member intersecting the range of said grab to effect the article discharge; and means for increasing the moving speed of the grab when the die halves are partially open whereby the time between entirely open die halves and entirely closed die halves is minimized.

4,028,040

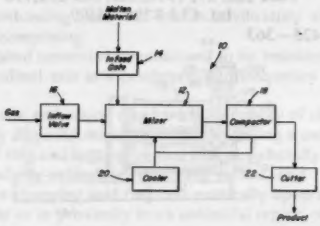
MATERIAL MIXING AND COMPACTING APPARATUS

Owen R. Waltrip, Roseville, Calif., assignor to Nuclear Supreme, Casper, Wyo.

Filed July 9, 1976, Ser. No. 704,077

Int. Cl.² B29C *3/04*

U.S. Cl. 425—449 **11 Claims**



1. Apparatus for processing a molten material, comprising an elongated housing having a pressure sealed mixing zone and a compaction zone, means for regulating infeed of said molten material into the mixing zone of the housing, means for displacing the material received from the infeed regulating means from the mixing zone into the compaction zone, means for injecting fluid into the material within the mixing zone, means for cooling the material within the housing to form a solid mass within the compaction zone, and means for expelling the solid mass, when formed, from the compaction zone.

4,028,041

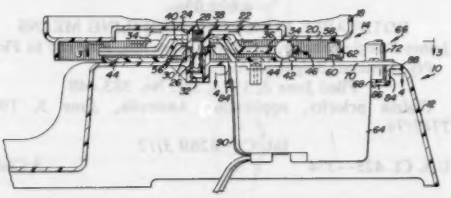
POTTER'S WHEEL

Nobile Zambrano, Jr., Branford, Conn., assignor to Gabriel Industries, Inc., New York, N.Y.

Filed May 4, 1976, Ser. No. 683,438

Int. Cl.² B28B *1/02*; F16H *13/08*

U.S. Cl. 425—459 **8 Claims**



1. A potter's wheel, comprising:

a casing;

a turntable assembly removably mounted on said casing, said turntable assembly including a turntable having a peripheral rim, said turntable being rotatably mounted on said casing, and a bearing assembly disposed beneath said turntable, said turntable and said bearing assembly being coupled for removal from said casing as a unit, a motor housing and a motor mounted therein having a shaft provided with a drive sleeve, said shaft and drive sleeve projecting outwardly from said housing, said housing

being removably mounted on said casing for reciprocating movement thereon; and

means operatively associated with said motor housing and said casing for displacing said motor housing in a first direction to cause said drive sleeve to rollably engage said turntable peripheral rim and in a second direction to cause said drive sleeve to disengage said rim.

4,028,042

MOULDING APPARATUS

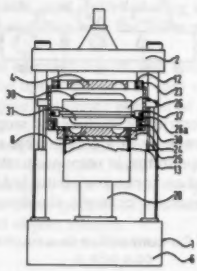
Anthony Gerald Goodfellow, Maghull, near Liverpool, and Maurice Rand, Skelmersdale, both of England, assignors to Dunlop Limited, London, England

Continuation of Ser. No. 495,135, Aug. 6, 1974, abandoned. This application Apr. 14, 1975, Ser. No. 567,843

Claims priority, application United Kingdom, Aug. 14, 1973, 38338/73

Int. Cl.² B29C *17/00*; B29F *1/00*

U.S. Cl. 425—515 **13 Claims**



1. A moulding apparatus for moulding a hollow rubber article which is first formed in two or more separate parts, the apparatus comprising:

a. means to pre-work unvulcanized rubber without any substantial curing, prior to the rubber being formed into the parts;

b. two mould halves arranged for relative movement towards and away from each other, and each having a mould cavity for a respective one of said article parts, and a locking spue groove adjacent said mould cavity to prevent accidental displacement of a moulded article part from its respective mould cavity;

c. two sleeves respectively surrounding and carried by said two mould halves and having similar radial cross-section;

d. male formers to co-operate respectively with the mould cavities to provide mould chambers into which molten rubber can be fed to provide said article parts;

e. means to feed the pre-worked rubber to said mould chambers; and

f. means to provide super-atmospheric gaseous pressure in the space between the mould halves when separated apart, said last recited means including a retractable casing which is movable between an operative position in which the mould halves are enclosed in a gas-tight volume by the casing, and a retracted position in which the mould halves are not enclosed in a gas-tight volume, said casing having in two opposed walls thereof corresponding apertures which can engage in a gas-tight fit the two respective sleeves carried by the two mould halves.

4,028,043

CIGARETTE LIGHTER WITH PRESALE TAMPER PROTECTION

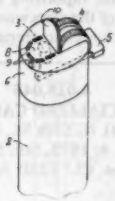
Guy Neyret, Francheville, France, assignor to Genoud & Cie., Venissieux, France

Filed July 29, 1975, Ser. No. 600,072

Claims priority, application France, July 29, 1974, 74.27049

Int. Cl.² F23Q *25/00*

U.S. Cl. 431—144 **5 Claims**



1. A lighter comprising:

a reservoir having an end and containing a supply of fuel;

a burner on said end;

valve means at said end between said burner and the interior of said reservoir actuatable for feeding said fuel to said burner;

ignition means at said end adjacent said burner and having a striker wheel rotatable for sparking at said burner and igniting fuel issuing therefrom;

an anular metal cap covering said end and having a flat wall extending transversely to said burner, said wall being formed with a window receiving said wheel and aligned with said burner;

a metal tab received within said window and covering said burner; and

a destructible connection securing said tab in said portion;

said tab and said connection unitarily formed with said cap, said connection being at least one relatively thin web interconnecting said tab and said cap, said wheel projecting above said wall.

4,028,044

FUEL BURNERS

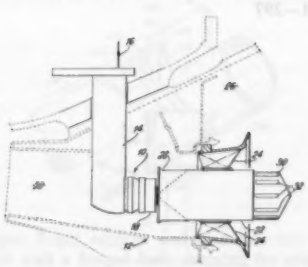
Denis Richard Carlisle, Risley, England, assignor to Rolls-Royce (1971) Limited, London, England

Filed Sept. 30, 1975, Ser. No. 618,238

Claims priority, application United Kingdom, Oct. 7, 1974, 43418/74

Int. Cl.² F23R *1/00*

U.S. Cl. 431—158 **4 Claims**



1. A gas turbine engine fuel burner positioned in a combustion chamber comprising:

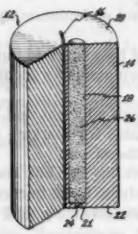
a fuel supply means having at least one fuel nozzle and a vaporizing and pre-mixing duct which is arranged to receive both fuel from the fuel supply means and a supply

of compressed air, said vaporizing and pre-mixing duct being closed off at its downstream end and having an outlet just upstream of the downstream end for discharging a vaporized mixture of fuel and compressed air into the combustion chamber for burning therein, said outlet comprising a plurality of slots spaced around the periphery of the duct, said slots being elongated and having the longest side of each slot extending substantially parallel to the longitudinal axis of the duct, said slots having a total surface area which is substantially one third of a total exterior area of said vaporizing and pre-mixing duct between extremities of the slots whereby the fuel burner has good weak extinction characteristics.

4,028,045
SPECIALIZED CANDLE

Wilfred L. Reiher, 4701 N. 55th St., Phoenix, Ariz. 85018

Filed Apr. 4, 1975, Ser. No. 565,270
Int. Cl.² F23D 3/16
U.S. Cl. 431—289 4 Claims

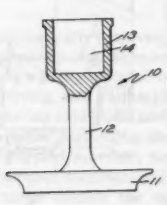


1. A candle structure comprising:
a. an elongated candle body having a coextensive bore;
b. an elongated candlewick in said candle body and extending substantially along the longitudinal axis thereof; and
c. a wickless columnar body located within said bore and laterally spaced from and substantially parallel with respect to said candlewick and coextending therewith, said columnar body formed of a mixture of candle wax and a deodorizing chemical, said columnar body located adjacent said candlewick for controlled release of the deodorizing chemical in response to the heat of the flame of said candlewick when said candlewick is lit.

4,028,046
METHOD OF MOUNTING A CANDLE

Charles A. Kilvert, 21 Barnes St., Providence, R.I. 02906

Filed Oct. 3, 1975, Ser. No. 619,211
Int. Cl.² F23D 3/16
U.S. Cl. 431—297 2 Claims

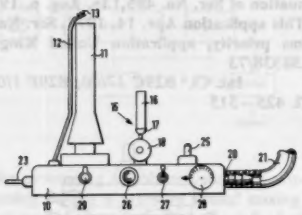


1. In the method of mounting a candle with a solid circular end diameter base comprising providing a candlestick holder having an upwardly opening recess therein and a cup with a uniform inner surface diameter and an imperforate bottom and an upstanding side wall of an outer size to fit into said recess, placing said cup in said recess with molten material surrounding said upstanding side wall, allowing the molten material to solidify and secure the cup in said recess, reducing by showing the solid base of said candle to a uniform circular diameter to fit within the upstanding wall of said cup and mounting the candle in said cup with its base against the inner surface thereof.

4,028,047
PHOTOELECTRIC START-STOP CONTROLS FOR GAS BURNER

Alfred Strunz, Rietberg, and Jürgen Rohrer, Gutersloh, both of Germany, assignors to Firma Dr. Th. Wieland, Pforzheim, Germany

Filed Dec. 19, 1975, Ser. No. 642,571
Claims priority, application Germany, Dec. 21, 1974, 2460745
Int. Cl.² F23D 13/40
U.S. Cl. 431—355 9 Claims



1. A device for electrically starting and stopping the operation of a bunsen burner, or of a comparable source-fed intermittently operable apparatus, in response to the presence in its immediate vicinity of and operator's hand holding an object to be heated by the burner, for example, the device comprising in combination:
a gas line adapted for connection to a source of combustible gas;
a solenoid valve in the gas line, the valve being normally closed and opening in response to the energization of the solenoid coil;
a connection to a source of electrical power for the operation of the solenoid valve; and
a dimmer switch circuit with a valve relay controlling the solenoid valve; and wherein
said circuit includes means for photoelectrically sensing the presence of the operator's hand in the vicinity of the burner, by responding to its shadow in an ambient light field other than the light field which is created by the gas burner when its flame is burning.

4,028,048
SCRAP METAL PREHEATING APPARATUS AND METHOD

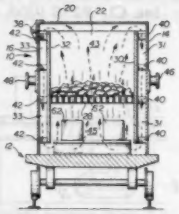
Harrison R. Woolworth, P.O. Box 88573 Tukwila Branch,, Seattle, Wash. 98188

Continuation-in-part of Ser. No. 543,114, Jan. 22, 1975, abandoned. This application Oct. 20, 1975, Ser. No. 623,998
Int. Cl.² F27D 7/00, 17/00
U.S. Cl. 432—5 12 Claims

1. A movable apparatus for preheating a material comprising:
a. housing means defining a substantially fluid tight receptacle having a top,
b. a load-supporting member located within said housing means and so positioned therein as to divide said receptacle into a closed upper portion and a lower portion, said load-supporting member having apertures therein placing

the lower portion of said receptacle in fluid communication with the upper portion of said receptacle along a first flow path,

c. conduit means associated with said housing means and defining a fluid channel for placing the upper portion of said receptacle in fluid communication with the lower portion of said receptacle via a second flow path separate from said first flow path, said conduit means having an inlet positioned adjacent said top of said receptacle, said inlet placing said fluid channel in fluid communication with the upper portion of said receptacle, said conduit means extending from the upper portion of said receptacle to the lower portion of said receptacle, said conduit



means having an outlet positioned in the lower portion of said receptacle, said outlet placing said fluid channel in fluid communication with the lower portion of said receptacle,

d. door means associated with said housing means to allow access to the upper portion of said receptacle,

1. for charging the upper portion of said receptacle with a material to be heated, and,
2. for discharging a heated material from the upper portion of said receptacle, and,

e. means associated with said housing means for gaining access to the lower portion of said receptacle for positioning a heated object therein.

4,028,049

METHOD AND INSTALLATION OF TREATING RAW MATERIAL FOR PRODUCING CEMENT

René Naudy, Narbonne; Francois Phoyu, Port La Nouvelle; Louis Robert, Port La Nouvelle; Maurice Legousse, Port La Nouvelle; Jean-Marie Audouard, Boulogne, and Hervé Le Roux, Montelimar, all of France, assignors to Ciments Lafarge S.A., Paris, France

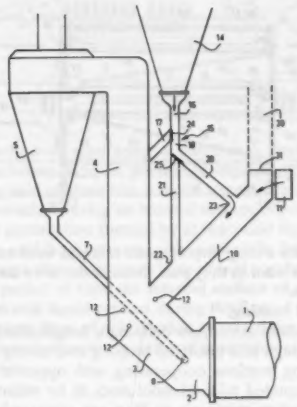
Filed Mar. 25, 1975, Ser. No. 561,856

Claims priority, application France, Mar. 29, 1974, 74.11196; Sept. 11, 1974, 74.30711

Int. Cl.² F27B *15/00*

U.S. Cl. 432—14 **4 Claims**

1. In a method for treating raw material containing solid substances for producing cement, in an installation comprising: a rotary clinkerization kiln, said kiln having an inlet end and an outlet end, said kiln inlet end being in communication with a junction chamber defined by a junction member; a downwardly directed flow path including a plurality of successive cyclones each defining a cyclone chamber, a fumes conduit for interconnecting the last of said cyclone chambers with said junction chamber whereby the fumes issuing from said inlet end of said kiln will flow through said junction chamber and said fumes conduit into said last cyclone chamber, a material inlet conduit for interconnecting the material outlet of said last of said cyclones with said junction chamber at a point adjacent said kiln inlet; said method comprising the steps of drying, dehydroxylating, and decarbonating said material by feeding said solid substances along said downwardly directed flow path into said inlet end of said clinkerization kiln, and contacting said solid substances, while said substances are fed along said downwardly directed flow path, with a current of upwardly directed gases generated in said kiln and issuing through said inlet end thereof, the improvement comprising the additional steps of: removing an adjustable portion of the material issuing from the penultimate one of said successive cyclones and injecting said removed portion of material into said junction chamber at a location downstream, with reference to the flow direction of said current of gases issuing from said inlet end of said kiln, from the point of communica-



tion of said materials inlet conduit with said junction chamber, and directing the remainder of said material issuing from said penultimate cyclone into said fumes conduit at a point downstream of said injection location of said adjustable portion of material issuing from said penultimate cyclone, whereby said adjustable portion of material may be used to cool the current of gases issuing from said inlet end of said kiln to thereby reduce the buildup of deposits in said installation.

4,028,050

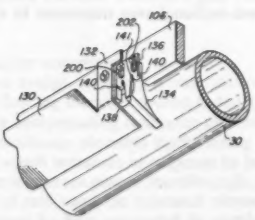
STRIPPER FINGER AND COMBINATION MOUNTING MEANS THEREFOR

Ari Bar-on, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed June 24, 1974, Ser. No. 482,676

Int. Cl.² B65H *29/56*

U.S. Cl. 432—59 **6 Claims**



6. Stripper finger support and bias structure utilized in conjunction with a heated fuser member for stripping copy sheets therefrom, said structure comprising:

a unitary member havng a pair of rolled portions providing bearing surfaces for a shaft of said stripper finger, said unitary member also having a finger engaging portion which biases the stripper finger into engagement with said heated fuser member to thereby provided suitable contact engagement pressure.

4,028,051

CURING OVEN FOR MINERAL WOOL

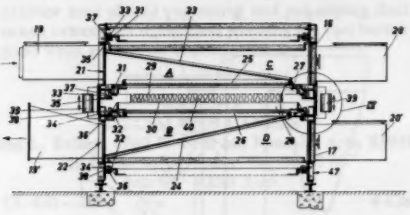
Bengt Lundström, Torslanda, Sweden, assignor to Jungers Verkstads AB of Goteborg, Sweden

Filed Sept. 5, 1975, Ser. No. 610,854

Claims priority, application Sweden, Sept. 27, 1974, 7412167

Int. Cl.² F27B 9/00; F26B 25/00

U.S. Cl. 432—144 6 Claims



1. An oven for curing impregnated mineral wool mats, such as rock or glass wool as they pass through the oven comprising in combination:

an insulated housing;

a pair of endless conveyors defining a longitudinal path of travel through said insulated housing and having opposed confronting portions cooperating with opposite sides of the impregnated mineral wool mats to be maintained at an appropriate thickness as they are conveyed through the oven;

the oven including pressure-and-evacuation chamber means at opposite sides of the longitudinal path of travel of the conveyors and including means for directing a fluid treatment medium through the mat between the opposed confronting portions of the conveyors;

means for driving the conveyors through the insulated housing, said means for driving the conveyors being located outwardly of the pressure-and-evacuation means whereby the means for driving the conveyors are not generally subjected to curing temperatures immediately present in the chambers where the mineral wool is being cured, said oven including mutually-reversed separate chamber means communicating with said pressure-and-evacuation means for circulating the fluid treating medium through opposite sides of the mineral wool mats as they are cured, and

means connected to the oven for maintaning interior areas of the housing, outside the pressure-and-evacuation chamber means, at a lower pressure than ambient pressure, said pressure-and-evacuation chamber means for directing the fluid treatment medium comprising a decreasing cross-sectional area transverse to the longitudinal direction of travel of the conveyors and in communication with induction and evacuation ports through which the fluid treatment medium is circulated.

4,028,052

TUNNEL FURNACE FOR THE HEAT TREATMENT OF ARTICLES

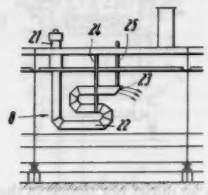
Gerardus H. Th. M. Verhoeven, Zevenaar, and Heinrich P. Stensen, Nijmegen, both of Netherlands, assignors to Smit Ovens Nijmegen B.V., Nijmegen, Netherlands

Filed Apr. 23, 1975, Ser. No. 570,966

Claims priority, application Germany, Nov. 4, 1974, 7436722[U]

Int. Cl.² F27B 9/00

U.S. Cl. 432—145 4 Claims



1. A tunnel furnace composed of individual sections for the heat treatment of articles which are transported through said tunnel comprising:

a rotating, endless, air permeable conveyor belt for carrying said article through a main heating space;

means for separating each said section into said main heating space and outer spaces on either side of said main space in communication with said heating space at the top thereof and below said belt;

circulation fans within said furnace for circulating air in a continuous path upwards through said conveyor belt and then downwards through said outer spaces;

a heater disposed in each said outer space comprising a vertically extending burner pipe and a pipe section extending therefrom in a vertical plane in said outer space for conducting the flame and combustion gases, said section having an S-shaped configuration with vertically spaced horizontal portions connected by U-shaped portions so that the combustion gases flow upward during a portion of their travel within said section and for heating said circulating air which moves past said burner pipe and said section, said section terminating in a mouth exposed to the circulating air flow.

4,028,053
FIRE RETARDANT FABRICS AND METHOD FOR PREPARATION THEREOF

Marshall W. Duke, Aiken, S.C., assignor to United Merchants and Manufacturers, Inc., New York, N.Y.

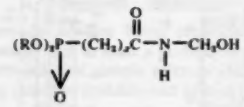
Continuation-in-part of Ser. No. 314,532, Dec. 13, 1972, abandoned. This application Feb. 18, 1975, Ser. No. 550,295

Int. Cl.² D06M *1/00*

U.S. Cl. 8—116 P **10 Claims**

1. A process for rendering a cellulose containing fabric fire retardant comprising:

a. impregnating the fibers of a cellulose-based fabric having a minimum cellulose content of about 80% by weight with an aqueous solution of an aminoplast resin, an acid having a first hydrogen acid dissociation constant in the range from about 1×10^{-1} to 5×10^{-5}, and an effective amount of a dialkyl phosphono methylol alkylamide to produce fire retardancy in the resulting fabric having the formula



(I)

Wherein R is a lower alkyl having from 1 to 6 carbon atoms and *x* is an integer from 1 to 3;

b. wet fixing the resin in the impregnated fabric and then

c. drying the fabric;

d. curing the resin in the fabric, and

e. washing and drying the fabric.

4,028,054
PERMANENT-PRESS SYSTEM

Bernard F. North, Rock Hill, and George H. Lourigan, Chester, both of S.C., assignors to Sun Chemical Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 565,071, April 9, 1975, Pat. No. 3,954,405. This application Mar. 26, 1976, Ser. No. 670,705

Int. Cl.² D06M *13/34, 13/36*

U.S. Cl. 8—185 **10 Claims**

5. In a process for producing crease-resistant textiles comprising impregnating a textile with a solution of dimethylol dihydroxyethylene urea or a partially or wholly methylated derivative thereof, a catalyst, and a buffering agent and heating the impregnated textile to cure the resulting impregnated textile and impart crease-resistance thereto, the improvement wherein the catalyst is aluminum sulfate and the buffering agent is sodium metaborate.

4,028,055
ANTI-CORROSIVE AGENT FOR METALS

Tsunesuke Doi, Tama; Hiroshi Komoto, Yokohama; Masazumi Chono, Yokohama; Akira Inoue, Yokohama; Kazuaki Saito, Chigasaki, and Isao Shinozuka, Kawasaki, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Mar. 17, 1976, Ser. No. 667,622

Claims priority, application Japan, Mar. 19, 1975, 50-33392

Int. Cl.² C09K *3/00;* **C23F** *11/04, 11/06, 11/10;* **C23G** *1/05, 1/18, 1/26*

U.S. Cl. 21—2.7 R **7 Claims**

1. A method of inhibiting corrosion of metal surfaces comprising applying to a metal surface a solution or dispersion containing an effective concentration of at least one saturated aliphatic triamine of 9 carbon atoms having a main chain which is branched at the 4-position and having a primary amino group at each carbon atom in a terminal position.

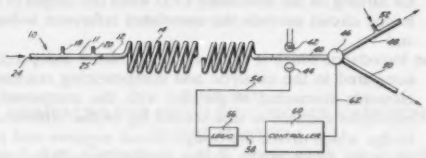
4,028,056
SUBSTANCE SEPARATION TECHNIQUE

Lloyd R. Snyder, Yorktown Heights; Bruce J. Oberhardt, Hartsdale, and Jack Olich, Mahopac, all of N.Y., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed Apr. 20, 1976, Ser. No. 678,778

Int. Cl.² B01D *43/00;* **B01L** *11/00;* **G01N** *33/00, 33/16*

U.S. Cl. 23—230 B **20 Claims**



1. A method of separating a particulate portion from a mixture including a liquid portion, comprising the steps of: introducing said mixture into a liquid stream flowing along an open bore conduit having an internal surface of porous configuration for permeation thereof by at least said liquid portion, segmenting said liquid stream with immiscible fluid segments during passage along said open bore of said conduit, permeating over a period of time the internal surface of said conduit with at least said liquid portion during the flow of said mixture along said open bore of said conduit to retard the flow of said liquid portion along said conduit and separating at least one of said portions.

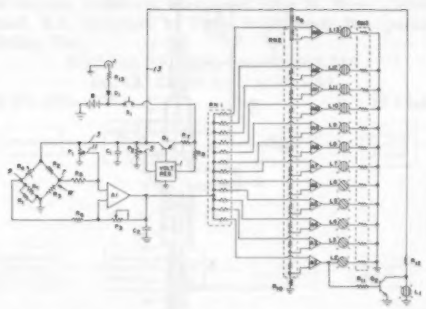
4,028,057
GAS ANALYZER

David M. Nelson, Verona, Pa., assignor to Ambac Industries, Inc., Pittsburgh, Pa.

Filed Apr. 29, 1976, Ser. No. 681,444

Int. Cl.² G01N *27/16;* **G08B** *21/00*

U.S. Cl. 23—254 E **4 Claims**



1. A gas analyzer comprising:

a Wheatstone bridge including a catalytic resistance element in a first leg thereof exposed to the gas to be analyzed and a compensating resistance element in a second leg, said resistance elements each having an electrical resistance which increases in response to heat generated by an electric current passed therethrough, the electrical resistance of said catalytic resistance element being further increased by heat generated by combustion of the gas to be analyzed coming in contact with the heated catalytic resistance element;

an electric power supply connected to said Wheatstone bridge;

a plurality of light emitting diodes arranged to form an analog display;

means for applying electric power from said power supply to successive LEDs in the analog display in proportion to the imbalance of the Wheatstone bridge produced by the

presence of the gas to be analyzed including a reference voltage generator for generating a plurality of voltages ranging in magnitude in steps from a voltage corresponding to a balanced output of the bridge up to a voltage corresponding to a predetermined imbalance, and comparison means associated with each LED in the analog display for comparing the output of the Wheatstone bridge with one of said plurality of reference voltages and for turning on the associated LED when the output of the bridge circuit exceeds the associated reference voltage; and

an impedance which is relatively temperature independent compared to the catalytic and compensating resistance elements connected in parallel with the compensating resistance element in said second leg of the Wheatstone bridge which drives the bridge circuit negative and prevents the LEDs in the analog display from illuminating until the catalytic and compensating resistance elements reach operating temperature.

4,028,058

DEVICE FOR MAKING MONOCRYSTALLINE GALLIUM ARSENIDE

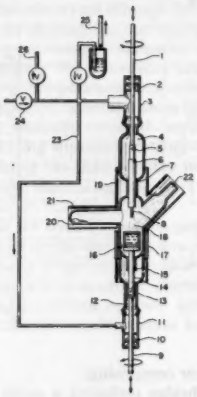
Klaus Beinert, and Herbert Weidner, both of Burghausen, Germany, assignors to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH, Burghausen, Germany

Filed Mar. 21, 1975, Ser. No. 560,744

Claims priority, application Germany, Apr. 30, 1974, 2420899

Int. Cl.² B01J *17/18*

U.S. Cl. 23—273 SP **6 Claims**



1. A device for making monocrystalline gallium arsenide by drawing a crystal from a gallium arsenide containing melt, comprising a quartz apparatus, a crucible in said apparatus for receiving the melt in an uncovered state, means for drawing the crystal, means for rotating and lifting or lowering said drawing means, means for rotating and lifting or lowering the crucible without rotating the entire quartz apparatus, said crucible having a driving shaft passing through ground-in joint, said joint comprising the core of said shaft and a quartz glass sleeve, said core being made from a material having a higher coefficient of expansion than quartz glass at the operating temperature of said joint and which is fracture proof and low in abrasion at the operating temperature of said joint said shaft carrying coupling means to said crucible to allow rotation of the crucible.

4,028,059

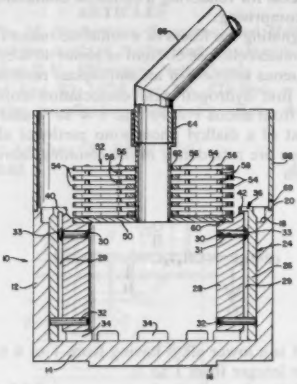
MULTIPLE DIES FOR RIBBON

Harold E. LaBelle, Jr., Hanover, and Charles J. Cronan, Taunton, both of Mass., assignors to Tyco Laboratories, Inc., Waltham, Mass.

Continuation-in-part of Ser. No. 641,744, Dec. 18, 1975, abandoned. This application Oct. 12, 1976, Ser. No. 731,948

Int. Cl.² B01J *17/18*; B22C *9/08*; B22D *39/00*

U.S. Cl. 23—273 SP **20 Claims**



1. Apparatus for use in growing crystalline bodies from the melt comprising a crucible open at the top and having a bottom wall and a side wall, and a die assembly disposed within said crucible, said die assembly comprising two separate parts in the form of inner and outer concentric members, said members being spaced with respect to one another to define a lower capillary passage having a bottom end that communicates with the interior space of said crucible adjacent said bottom wall, one of said members being longer than the other and having at its upper end an extension which overhangs and engages the upper end of said other member, said extension comprising first slots which subdivide said extension into a plurality of dies with top end surfaces and second slots in said dies which intersect the space between said inner and outer members and provide capillaries between said lower capillary passage and said top end surfaces of said dies.

15. A die assembly for use in growing a plurality of crystalline bodies from the melt, said die assembly comprising inner and outer concentric sleeves, said sleeves being spaced with respect to tone another to define a capillary passage, and means locking said sleeves against relative movement, one of said sleeves being longer than the other sleeve and having at one end a radially extending flange which overlies and engages the corresponding end of the other sleeve, said flange comprising first slots which subdivide said flange into a plurality of dies with top end surfaces and second slots in said dies which intersect the passage between said inner and outer sleeves and provide capillaries leading from said capillary passage to the top end surfaces of said dies.

4,028,060

METHOD AND APPARATUS FOR THE THERMAL EXTRACTION OF HYDROCARBONS FROM A SOLID MATRIX

Charles E. Godsey, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

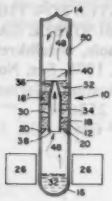
Filed Mar. 26, 1976, Ser. No. 670,790

Int. Cl.² B01D *11/02*

U.S. Cl. 23—293 R **15 Claims**

8. A method for extracting organic material from a sample portion of a solid matrix containing said organic material, said method comprising;

a. mixing said sample with a water absorbing material to form a sample mixture;
b. positioning said sample mixture in an apparatus comprising;
1. an outer tubular member having a first sealable end and a second sealed end; and
2. a permeable sample support means intermediate said first end and said second end of said outer tubular member



said sample mixture being supported by said support means so that at least a portion of said support means is between said sample mixture and said second end
c. sealing said first sealable end of said outer tubular member;
d. simultaneously heating said first end of said outer tubular member and cooling said second end of said outer tubular member.

4,028,061
SILVER-CADMIUM OXIDE ALLOYS

Han J. Kim, Chelmsford, and F. Joseph Reid, Acton, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

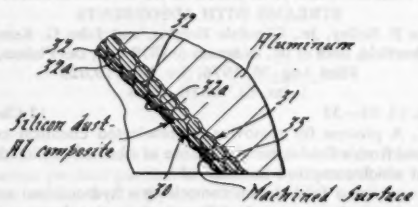
Division of Ser. No. 521,609, Nov. 11, 1974, Pat. No. 3,969,112. This application June 17, 1976, Ser. No. 696,979
Int. Cl.² C22C *5/10*
U.S. Cl. 75—233 **2 Claims**

1. An as-sintered, non-cold worked silver cadmium oxide alloy comprising about 70% to about 95% silver about 30% to about 5% cadmium oxide, and a quantity of the thermal decomposition product of from about 0.05% to about 0.5% of an additive selected from the group consisting of the alkali metal and alkaline earth metal salts of nitric acid, said alloy being characterized by an as-sintered density of about 99% of theoretical, and enhanced tensile strength and toughness.

4,028,062
ALUMINUM CYLINDER HEAD VALVE SEAT COATING TRANSPLANT

Adolf Hetke, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 608,439, Aug. 27, 1975. This application May 5, 1976, Ser. No. 683,368
Int. Cl.² B32B *15/20*
U.S. Cl. 428—558 **6 Claims**



1. A composite casting product, comprising:
a. cast body of aluminum substantially devoid of silicon,
b. a machined wear surface on said body disposed interiorly of said casting, said wear surface having a thin layer of silicon particles integrally bonded to said aluminum, each silicon particle having one flat facet exposed coincident with said surface and having the remaining facets thereof covered by an aluminum-silicon alloy layer acting as a metallurgical binder to the surrounding aluminum body.

4,028,063
COMPACTS FOR PREPARING SILVER-CADMIUM OXIDE ALLOYS

Han J. Kim, Chelmsford, and F. Joseph Reid, Acton, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

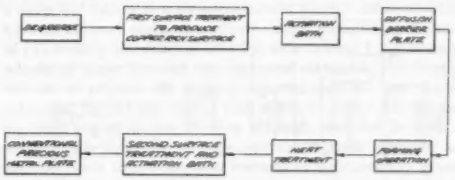
Division of Ser. No. 521,609, Nov. 11, 1974, Pat. No. 3,969,112. This application June 17, 1976, Ser. No. 697,175
Int. Cl.² B22F *3/02*
U.S. Cl. 75—233 **3 Claims**

1. A pressed unsintered compact comprising a mixture of about 70% to about 95% of finely-divided silver particles, about 30% to about 5% of finely-divided cadmium oxide particles, and about 0.05% to about 0.5% of an additive selected from the group consisting of the alkali metal and alkaline earth metal salts of nitric acid.

4,028,064
BERYLLIUM COPPER PLATING PROCESS

Stephen Cassidy, Canton, Mass.; Robert Baboian, Johnston; Raymond A. Frechette, Woonsocket, both of R.I.; Gardner S. Haynes, Attleboro, Mass., and John W. Ross, Cumberland, R.I., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 17, 1976, Ser. No. 658,319
Int. Cl.² C25D *5/12, 5/34, 5/50*
U.S. Cl. 428—675 **15 Claims**



2. A process for electroplating beryllium copper material in which a heat treatment after forming is needed to obtain a desired temper comprising the steps of:
degreasing the material to remove any organic substances;
passing the material through an anodic alkaline solution to form beryllium compounds of the beryllium in the beryllium copper both on the surface and in molecular portions immediately adjacent the surface of the beryllium copper;
passing the material through a concentrated sulfuric acid bath to dissolve the formed beryllium compounds thereby providing for a copper-rich skin;
activating the surface of the material for electroplating;
electroplating the copper-rich surface with a beryllium diffusion barrier plate;
heat treating the beryllium copper material to the desired temper;
activating the surface of the material for electroplating; and
electroplating the material with a suitable plating material.

4,028,065

MANGANESE CONTAINING FUELS

James W. Sprague, Bedford; Daniel W. Feldman, Beachwood, and Franklin Veatch, Cleveland, all of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 470,692, May 16, 1974, Pat. No. 3,966,429. This application Nov. 27, 1974, Ser. No. 527,676

The portion of the term of this patent subsequent to June 29, 1993, has been disclaimed.

Int. Cl.² C10L 1/18

U.S. Cl. 44—68 40 Claims

1. Gasoline containing an added gasoline soluble manganese compound to improve the octane rating of the gasoline and including a small but effective amount of a gasoline soluble hydrocarbon ester of citric acid.

4,028,066

LOW VISCOSITY-HIGH FLASH POINT RAMJET AND TURBOJET FUELS

George W. Burdette, and Dean H. Couch, both of China Lake, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 21, 1974, Ser. No. 516,068

Int. Cl.² C10L 1/16

U.S. Cl. 44—80 4 Claims

1. In the process for propelling a ramjet or turbojet engine wherein a fuel is injected into a combustion chamber, mixed with air and combusted, the improvement residing in utilizing, as the fuel, a mixture consisting essentially of 80 ± 2% petroleum distillate which boils at a temperature of from 380° F to 415° F and a balance butylbenzene, said mixture having a flashpoint of about 140° F and freezing at a temperature of lower than −65° F.

4,028,067

PROCESS FOR PRODUCING COMBUSTIBLE GASES

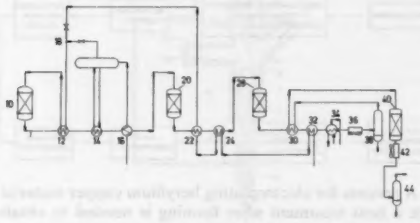
Colin William Gent, Stockton-on-Tees, England, assignor to Imperial Chemical Industries Limited, London, England

Filed June 3, 1975, Ser. No. 583,292

Claims priority, application United Kingdom, June 10, 1974, 25639/74

Int. Cl.² C10G 11/28

U.S. Cl. 48—197 R 4 Claims



1. A process for producing a substitute natural gas which consists essentially of reacting methanol vapour in a decomposition stage, wherein the feed to the decomposition stage contains steam and the molar ratio of steam to methanol is in the range of 0.3 to 2.0, under substantially adiabatic conditions with an outlet temperature of at least 600° C over a refractory catalyst having steam reforming and methanation activity, cooling the resulting gas by indirect heat exchange to a temperature in the range 250° –350° C, methanating the resulting cooled gas in a first catalytic methanation stage with an outlet temperature in the range 500° –650° C, cooling the resulting first catalytic methanation stage gas by indirect heat exchange and methanating the cooled gas in at least one further catalytic methanation stage, said refractory catalyst containing nickel, cobalt or mixtures thereof on a refractory support, the content of nickel, cobalt or mixtures thereof being in the range 40–85% by weight as metal oxide on the non-volatile content of the oxide precursor from which the catalyst is made by reduction, the refractory support having been introduced into the catalyst partly by coprecipitation and partly as solid powder.

4,028,068

PROCESS AND APPARATUS FOR THE PRODUCTION OF COMBUSTIBLE GAS

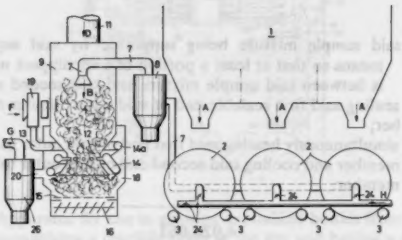
Karl Kiener, 7081 Goldshofe, Ostalbkreis, Germany

Filed June 26, 1975, Ser. No. 590,715

Claims priority, application Germany, July 4, 1974, 2432504; June 16, 1975, 2526947

Int. Cl.² C10J 3/06, 3/58

U.S. Cl. 48—209 7 Claims



1. A process for the disposal of domestic and industrial refuse with simultaneous production of combustible gases wherein domestic or industrial waste in particulate form is carbonised in a first process stage by indirect heating, with the exclusion of air, at a temperature between about 300° to 600° C producing carbonization gases and solid residues and said carbonization gases are passed to a separate, second process stage wherein, at a temperature between about 1000° and 1200° C, said gases are reacted with preheated air and solid carbonization coke from said first process stage to produce combustible gases, wherein (a) in said first process stage said waste in particulate form is subjected to continuous rotation in a cylindrical zone about a substantially horizontal longitudinal axis, (b) dust is separated from said carbonization gases between said first and second process stages, (c) the carbonization gases from step (b) are mixed with preheated air prior to contact with carbonization coke in said second process zone and (d) carbonization coke for said second process zone is obtained from a recovery stage in which solid residues produced in said first process stage are separated into a carbonization coke portion with an ash softening point of at least 1200° C and a non-combustible substances portion.

4,028,069

PURIFICATION AND DRYING OF HYDROCARBON STREAMS WITH ADSORBENTS

John P. Nolley, Jr., Glendale Heights, and John G. Kunesh, Deerfield, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Aug. 30, 1976, Ser. No. 719,029

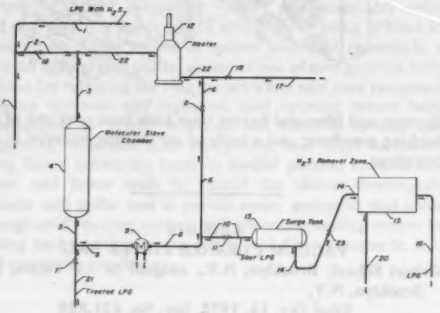
Int. Cl.² B01D 53/04

U.S. Cl. 55—33 12 Claims

1. A process for removing a preselected chemical compound from a fluid stream by the use of a bed of a solid adsorbent which comprises the steps of:

a. passing a feed stream comprising a hydrocarbon and a chemical compound different than the hydrocarbon through a first bed of adsorbent material at conditions effective to cause the removal of the chemical compound from the feed stream by adsorption, including a preselected adsorption temperature;

b. switching the passage of the feed stream from through the first bed of adsorbent material to through a second bed of adsorbent material;
c. heating the first bed of adsorbent material by continuously recirculating a fixed quantity of a heating fluid which comprises a hydrocarbon contained in the feed stream through the first bed of adsorbent material in a closed-loop recirculation system comprising a heating means and the first bed of adsorbent material while heat is being added to the heating fluid by the heating means;
d. terminating the closed-loop recirculation of the heating



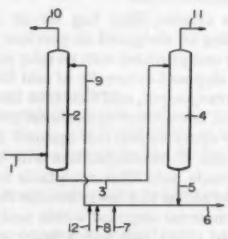
fluid when the first bed of adsorbent material reaches a preselected regeneration temperature;
e. passing a stream of regeneration fluid through the heating means and the first bed of adsorbent material at conditions effective to cause the transfer of the chemical compound from the first bed of adsorbent material to the stream of regeneration fluid and thereby forming a stream rich in the chemical compound and which is removed as an effluent stream; and,
f. terminating the removal of the effluent stream when substantially all of the chemical compound has been removed from the first bed of adsorbent material.

4,028,070

METHOD OF RECOVERING ETHYLENE OXIDE

Jiro Uchii, Kamakura; Masatsugu Kodo, Tokyo; Tsunehiko Soga, Koza, and Yutaka Morimoto, Yokohama, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Continuation of Ser. No. 459,962, April 11, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,841
Int. Cl.² B01D *19/00*
U.S. Cl. 55—48 **7 Claims**



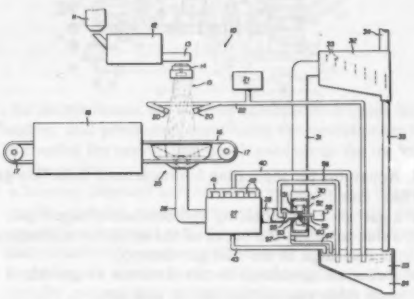
1. In the method of recovering ethylene oxide from the reaction product gas that is obtained by the catalytic vapor phase oxidation of ethylene with molecular oxygen over a silver-containing catalyst, which comprises conducting the said reaction product gas to an absorption column maintained at a pressure in the range of 2 – 40 kg/cm², countercurrently contacting said reaction product gas with an aqueous absorbent at said absorption column to dissolve ethylene oxide in the aqueous absorbent to form an aqueous ethylene oxide solution, conducting the thus formed aqueous solution to a stripping column, stripping and recovering ethylene oxide from said aqueous ethylene oxide solution at said stripping column, and thereafter recycling the remaining aqueous solution which is obtained after stripping ethylene oxide to said absorption column to be again used as the aqueous absorbent, the improvement of using as said aqueous absorbent one consisting essentially of ethylene glycol in the range of 1 – 30% by weight, 99 – 70% by weight of water and a defoaming agent consisting essentially of an organopolysiloxane in the range of 2 – 500 ppm and having a pH in the range of 3 – 12.

4,028,071

METHOD FOR REMOVING PARTICULATE POLLUTANTS FROM STACK GASES

Roland E. Langlois, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation-in-part of Ser. No. 532,264, Dec. 12, 1974, abandoned. This application Jan. 26, 1976, Ser. No. 652,370
Int. Cl.² B01D *47/18*
U.S. Cl. 55—89 **4 Claims**



1. In a glass wool product forming process wherein a stream of process air containing gaseous contaminants and solid contaminants of the size on the order of **100** microns or less flows through at least one centrifugal fan interposed between a drop out box and a de-entrainment device communicating with an exhaust stack, the improvement comprising the steps of (1) wetting the rotor of said fan with at least 1.5 gallons per minute of water for each one thousand standard cubic feet per minute of process air passing therethrough so that the fan rotor and shroud are coated with a film of water, (2) contacting said contaminants flowing through said fan in said air stream with said film to agglomerate at least some of said contaminants into composite masses of substantially greater size and mass, and (3) inertially separating said composite masses and the water from said air stream at the location of the fan and at the de-entrainment device prior to the passage of said air stream up the exhaust stack.

4. In a glass wool product forming process wherein a stream of process air is passed through a drop out box to remove about 90% of the process air contaminants to yield exit air at a relative humidity of about 100% and containing gaseous contaminants and solid and liquid contaminants of a size on the order of 100 microns or less flows through a centrifugal fan having rotor and shroud components and an inlet interposed between said drop out box and a de-entrainment device communicating with an exhaust stack, the improvement of removing at least about 45% of the contaminants from said exit air by the steps of (1) directly impinging a massive stream of water on the order of at least about 1.5 gallons of water per minute per 1,000 standard cubic feet per minute of process air onto the rotor of said fan to break-up the water stream into droplets thoroughly wetting the fan rotor and shroud, (2) contacting said particles with the water-wet rotor and shroud

components of said fan as the exit air is centrifugally pumped through the fan, so that the particles agglomerate into composite masses of substantially greater size and mass and (3) separating the agglomerated particles from said air stream by inertia separation during the passage of said air stream through the fan and through the de-entrainment device.

4,028,072

APPARATUS FOR SCRUBBING OF HYDROCARBONS FROM GAS

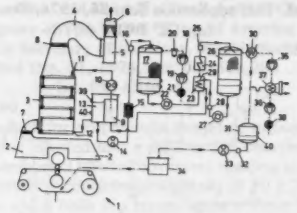
Walter Braun, Nievenheim, and Gunter Hoffmann, Stuttgen, both of Germany, assignors to Aluminium Norf GmbH, Stuttgen, Germany

Filed Oct. 24, 1975, Ser. No. 625,654

Claims priority, application Germany, Oct. 28, 1974, 2451157

Int. Cl.² B01D *47/00*

U.S. Cl. 55—195 **9 Claims**



1. Apparatus for separating hydrocarbons from flue gas or the like, comprising:

a. a gas scrubber receiving hydrocarbon-charged gas,

b. a flue to which the outlet of the scrubber is attached for the discharge of the said gas thereto,

c. a conduit connected to the scrubber to provide it with wash oil in counterflow to the said gas,

d. a collecting container connected by the said conduit and a pump to the scrubber to suppy it with the wash oil,

e. a vacuum distillation container connected by a conduit and a pump to the gas scrubber to receive wash oil discharged therefrom,

f. a condenser having an inlet connected by a conduit to the distillation container,

g. a vacuum pump assembly connected to the outlet of the condenser,

h. a condensate storage unit connected to the outlet of the condenser to receive the condensate, and

i. a pump having an inlet connected by a conduit to the output side of the distillation container to bring about the return of the wash oil passing from the distillation container through a conduit connecting the output of the pump to the collecting container.

4,028,073

CONTAINER FOR AIR TREATING MATERIAL

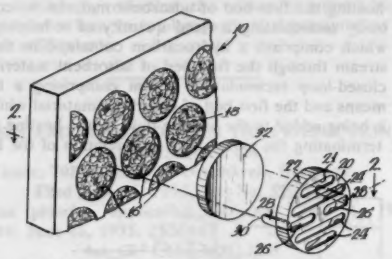
Charles M. Swaim, 994 Hampton Park, Barrington, Ill. 60010

Filed Mar. 12, 1976, Ser. No. 666,218

Int. Cl.² B01D *50/00*

U.S. Cl. 55—279 **3 Claims**

1. Air treating means including a container for holding a body of air treating material to an air filter in a ventilation system or the like, said container being formed of a bendable material and having a bottom, a peripheral upstanding side wall ex- tending from said bottom and terminating in an open top, there being a plurality of cutouts in said bottom to permit air to enter said container therethrough, at least one of said cutouts being elongated and defined by an elongated tab integral with said container and having a length greater than the height of said side wall, there being two said tabs, each remaining attached to said container adjacent said side wall, an air filter having a layer of filter material sandwiched between perforated backing members, said tabs extending



through said filter and having their ends bent over one of said backing members; and a body of air treating material in said container.

4,028,074

VACUUM CLEANER FILTER BAG

Robert Schaaf, Brooklyn, N.Y., assignor to Air Filters, Inc., Brooklyn, N.Y.

Filed Oct. 14, 1975, Ser. No. 621,828

Int. Cl.² B01D *46/02*

U.S. Cl. 55—366 **6 Claims**

1. A vacuum cleaner filter bag for an upright vacuum cleaner comprising an elongated air pervious filter receptacle having an upper end provided with an inlet port, an air impervious feed tube disposed externally of said filter receptacle in a side-by-side arrangement, said feed tube having a lower inlet end for releasable connection to an outlet port of the vacuum cleaner and an upper outlet end secured in a face-to-face relationship to and in communication with said inlet port of said filter receptacle, said filter receptacle including opening means to provide access to a lower interior thereof, a collar of relatively rigid material disposed within said filter receptacle intermediate said upper end and a lower end thereof, said collar being configurated to conform to the interior of said filter receptacle when in operating condition, clamping means disposed externally of said filter receptacle in juxtaposition with an upper portion of said collar for securing and supporting said upper portion of said collar in position by a clamping engagement against side walls of said filter receptacle, said clamping means being disposed between said filter receptacle and said feed tube, said feed tube being connected to said filter receptacle above and below said clamping means to

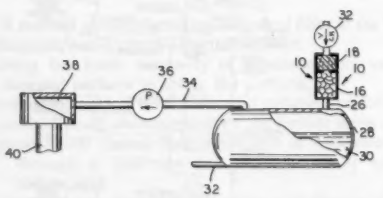
provide a space for receiving said clamping means, a dust receptacle removably disposed within said lower interior of said filter receptacle, said dust receptacle including an open mouth bag-like enclosure fabricated from an air impervious material and having its mouth portion disposed about a lower end of said collar, resiliently expandable ring means for releasably securing said dust receptacle mouth portion about said collar to maintain said dust receptacle in an open mouth suspended condition within said lower interior of said filter receptacle to receive and collect debris introduced into said filter receptacle, said collar being provided with a pair of axially spaced apart circumferential grooves in an external peripheral surface thereof to receive and removably retain said ring means, a lower one of said grooves being utilized for receiving said ring means to secure said dust receptacle in position against said collar, an upper one of said grooves being utilized for retaining the ring means while said dust receptacle is being removed and replaced, said opening means being dimensioned to permit insertion and removal of said dust receptacle from said filter receptacle, said filter receptacle being flared outwardly from its medial portion towards said upper and lower ends to funnel the debris downwardly towards said collar and to permit easier access to said collar through said opening means, and releasable sealing means for sealing said opening means when said filter receptacle is in said operating condition.

4,028,075

FUEL TANK CAP

Emile Roberge, 90 Portland Ave., Dover, N.H. 03820

Filed Nov. 2, 1976, Ser. No. 738,229
Int. Cl.² B01D *53/02*
U.S. Cl. 55—387 **7 Claims**



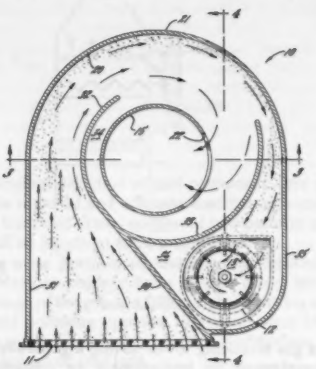
4. A fuel system comprising:
a fuel tank containing liquid and vapor fuel, said vapor phase being above said liquid phase in said tank;
a first fuel outlet line connected to the liquid fuel phase in said tank;
a second fuel outlet line connected to the vapor fuel phase in said tank;
a fuel inlet line connected to said tank;
a fuel tank cap adapted to be placed in said fuel inlet line, said cap including,
a cylindrical body member having a lower open end and a closed upper end,
a chamber in said body member adjacent said lower end containing fuel vapor absorbent material; and
valve means between said chamber and upper end of said body member for permitting air to flow through said chamber from the atmosphere.

4,028,076

CENTRIFUGAL AIR PRECLEANER FOR INTERNAL COMBUSTION ENGINES

Gerald S. Fields, Boulder, Colo., assignor to Parma Industries, Inc., Longmont, Colo.

Filed Aug. 18, 1975, Ser. No. 605,345
Int. Cl.² B01D *45/16*
U.S. Cl. 55—394 **10 Claims**



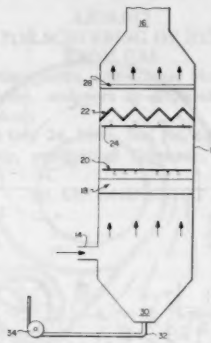
1. An air precleaner for internal combustion engines having air intakes, said precleaner comprising the combination of
a. a conduit for conducting precleaned air to the air intake of the engine,
b. a housing disposed around said conduit and having an air intake opening, an arcuate wall adjacent said intake opening and spaced radially outwardly from said conduit and substantially concentric therewith for conducting the incoming air stream from said intake opening circumferentially around said conduit so that any dust in said air stream is collected along the housing wall by centrifugal action, a pair of end walls attached to opposite ends of said arcuate wall, and a dust outlet for discharging dust from said housing at one end of said arcuate wall,
said conduit having a clean air port near said one end of said arcuate wall for discharging clean air from the inner region of the space between said arcuate wall and said conduit, said conduit also having an open end which extends through one of the end walls of said housing,
c. an internal baffle integral with said arcuate wall and extending between said arcuate wall and said conduit at said intake opening, said internal baffle forming a restricted passageway that increases the velocity of the incoming air at the other end of said arcuate wall and also forming a dust-receiving chamber at said one end of said wall, said dust-receiving chamber communicating with said dust outlet for discharging the dust from said housing, said internal baffle extending around a major portion of said conduit and spaced therefrom to form a recirculating passageway for recirculating any clean air that does not enter said clean air port around said conduit and back toward said clean air port without mixing said clean air with the incoming air in said restricted passageway, said internal baffle extending to a point such that the space between said arcuate housing wall and said conduit is uninterrupted between said restricted passageway and said dust receiving chamber so as to provide an enlarged chamber in which the velocity of the air stream is reduced to facilitate discharge of the clean air through said clean air port, and
d. means for withdrawing air from said housing through said dust outlet so as to draw ambient air into said housing through said intake opening.

4,028,077

MIST ELIMINATOR

Robert Joseph Gleason, Edison, N.J., assignor to Research-Cottrel, Inc., Bound Brook, N.J.

Filed Jan. 15, 1976, Ser. No. 649,234
Int. Cl.² B01D *45/00*
U.S. Cl. 55—442 **2 Claims**



1. In a gas scrubbing tower having a generally vertical gas flow therethrough an impingement or rebound separator, means mounted across the tower in the path of the gas flow for removing mist from the flow of gas comprising a first series of spaced apart eliminator blades, at least one end plate, each of said first of the series of eliminator blades having at least one of its ends connected to said at least one end plate with the transverse axis of each said blade sloping at an angle of from about 20° to about 30° to the direction of flow of the gas through the tower and a second series of spaced apart eliminator blades each having at least one of its ends connected to said end plate with a transverse axis of each eliminator blade sloping at an angle of from about 20° to about 30° to the direction of flow of gas through the tower but pitched in an opposite direction to the pitch of the first series of eliminator blades, the first and second series of eliminator blades defining a separator unit having a plurality of gas flow channels therebetween with the longitudinal axis of the blades of the separator unit tilted at an angle of from about 30° to about 45° to the direction of flow of gas through the tower so that liquid removed from the gas stream will be channeled along the edges of the first and second series of eliminator blades to collection means which may comprise the at least one end plate and wherein a pair of the said impingement separators are assembled in a V-type configuration with the apex of the V being positioned downstream with respect to the gas flow through the tower.

4,028,078

METHOD AND APPARATUS FOR ABSORPTION REFRIGERATION SYSTEM

David G. Peckham, La Crosse, Wis., assignor to The Trane Company, La Crosse, Wis.

Filed June 17, 1976, Ser. No. 696,945
Int. Cl.² F25B *15/00, 27/00*
U.S. Cl. 62—101 **12 Claims**

9. The method of producing refrigeration comprising the steps of:

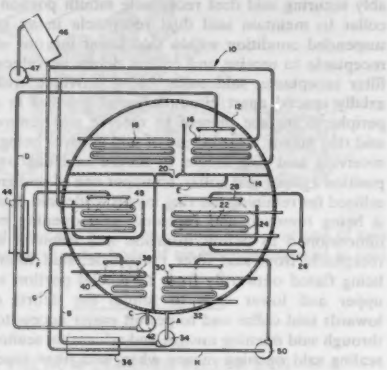
a. heating at high pressure by an external heat source a fully diluted absorption solution to generate a refrigerant vapor and a partially concentrated absorption solution;

b. cooling said refrigerant vapor to form a refrigerant condensate;

c. evaporating said refrigerant condensate to derive a cooling effect and thereby forming a refrigerant vapor;

d. heating at low pressure by an external heat source said partially concentrated absorption solution to generate a secondary vapor and a concentrated absorption solution;

e. passing said concentrated absorption solution in intimate contact with said refrigerant vapor to thereby absorb said refrigerant vapor into said absorption solution at low pressure to form a partially diluted absorption solution;



f. passing said partially diluted absorption solution at high pressure in intimate contact with said secondary vapor to absorb said secondary vapor and form a fully diluted absorption solution; and

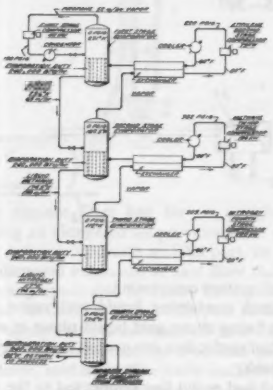
g. returning said fully diluted solution to step (*a*).

4,028,079

CASCADE REFRIGERATION SYSTEM

Edward G. Scheibel, Media, Pa., assignor to Suntech, Inc., St. Davids, Pa.

Filed Feb. 23, 1976, Ser. No. 660,218
Int. Cl.² F25B *7/00*
U.S. Cl. 62—335 **7 Claims**



1. A cascade refrigeration system where low pressure vapor from an evaporator stage is compressed and then recycled for condensation to the evaporator of a previous stage which comprises passing the low pressure vapor from an evaporator stage through a heat exchanger to heat said vapor to ambient temperature, compressing said vapor through a cooler, cooling said compressed vapor by passing said vapor through said heat exchanger in heat exchange relationship with said low pressure vapor, condensing said vapor in the evaporator of the

next higher temperature cycle of the cascade system and recycling the liquid to the low pressure evaporator stage.

4,028,080

METHOD OF TREATING OPTICAL WAVEGUIDE FIBERS

Sam Di Vita, West Long Branch, and John R. Vig, Colts Neck, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 23, 1976, Ser. No. 699,150
Int. Cl.² C03C *15/00*
U.S. Cl. 65—2 **16 Claims**

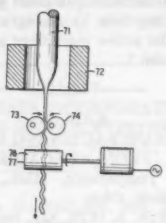
1. Method of treating glass optical waveguide fibers, said method comprising irradiating the fibers at about 1,000° C in an oxygen-containing environment with shortwave ultraviolet light, wherein the shortwave ultraviolet used has two important wave lengths between 1700 and 2700 angstroms, with at least one wavelength being less than 2400 angstroms in length and capible of being absorbed by oxygen to generate ozone, the other wavelength capible of being absorbed by hydrocarbons and ozone.

4,028,081

METHOD FOR MANUFACTURING HELICAL OPTICAL FIBER

Enrique Alfredo Jose Marcatili, Rumson, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 639,842, Dec. 11, 1975. This application Sept. 28, 1976, Ser. No. 727,464
Int. Cl.² C03B *37/02*
U.S. Cl. 65—2 **9 Claims**



1. A method of manufacturing an optical fiber in the form of an elongated helix, comprising the steps of:

heating the lower extremity of a substantially vertically disposed preform to soften the preform; and

drawing the optical fiber from said softened preform, said method being characterized by the further steps of:

passing said optical fiber, while still in a softened state, through at least one pair of eccentrically rotatable rollers; and

rotating said rollers in synchronism with the rate at which said fiber is drawn from the softened preform.

4,028,082

METHOD OF MAKING ARTIFICIAL INTRAOCULAR LENSES WITH HOLES

David A. Krohn, Southbridge; Bernard Grolman, Worcester, both of Mass., and Walter P. Siegmund, Woodstock, Conn., assignors to American Optical Corporation, Southbridge, Mass.

Filed Feb. 10, 1976, Ser. No. 656,780
Int. Cl.² C03C *19/08, 15/00*
U.S. Cl. 65—23 **6 Claims**

1. The method of making a lens for a pseudophakos having spaced apart holes adjacent its edge, said method comprising the steps of:

preparing a preform of pieces of lens material and parallel columns of leachable material by assembling in juxtaposition with said columns a number of said pieces of lens material, said columns and lens materials having compatible drawing temperatures and coefficients of thermal expansion and being so geometrically arranged in said preform as to space said columns apart from each other and away from the center of said preform according to relative positions desired of holes to be produced in said lens adjacent its edge;

heating and drawing at least a portion of said preform to a reduced cross-sectional size in a directon parallel to the

longitudinal direction of said columns to fuse said pieces of lens material and columns together as a unit;

cutting from said drawn portion of said preform a cross-section of its length to form a lens blank;

leaching away portions of said columns remaining in said lens blank to produce holes in their place; and

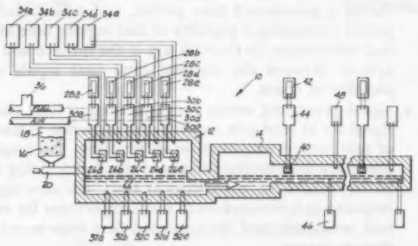
at one stage of the process following said cutting step, grinding and polishing opposite sides and edges of said lens blank to the final thickness and curved surface configuration desired of said lens.

4,028,083

METHOD AND APPARATUS FOR CONTROLLING TEMPERATURE WITHIN A FURNACE

Richard Arthur Patznick, Toledo, and Gary Clayton Border, Bowling Green, both of Ohio, assignors to Johns-Manville Corporation, Denver, Colo.

Continuation of Ser. No. 498,688, Aug. 19, 1974, abandoned. This application Oct. 16, 1975, Ser. No. 622,931
Int. Cl.² C03B *5/24*
U.S. Cl. 65—29 **14 Claims**



1. A method for controlling temperatures in a furnace which includes a melting and refining tank wherein the furnace has a plurality of zones through which molten material within the furnace passes, each zone having a means for sensing temperature, means for providing heat input into the zone, and regulator means for regulating the amount of heat input into the zone, said regulator means being responsive to a signal from a signal generating means, comprising:

a. determining the desired temperature for each of said zones,

b. sensing the current temperature in each zone adjacent the end of a regular time interval,

c. measuring the total heat input into each of said zones during said regular time interval,

d. accumulating first data in a storage device comprising all historical heat inputs representing the total heat input into each of said zones for each regular time interval during a preselected time period, said preselected time

period comprising a plurality of said regular time intervals, and information on thermal lags in the furnace and interactions between the separate total heat inputs of the plurality of zones,

e. after each regular interval comparing the last sensed temperature for each zone with the desired temperature level for that respective zone,

f. when at least one of said last sensed temperatures differs from the desired temperature level for its respective zone, generating at least one new signal for the regulator means of said at least one zone by comparing said temperature difference with respect to the last sensed temperatures for each of said zones and said accumulated first stored data,

g. sending said at least one new signal to at least one regulator means to adjust the total heat input into said at least one of the zones for the next said regular time interval to reduce any temperature difference between the actual zone temperature and the desired temperature for said zone, and

h. after said signal generating step, adding data, representing any total heat input signal to said regulator means for said plurality of zones at the time of said sending step, to said accumulated first stored data to be used in the signal generating step after the next regular interval.

8. Apparatus for controlling temperatures in a furnace which includes a melting and refining tank wherein the furnace has a plurality of zones through which molten material within the furnace passes, each zone having means for heating the molten material and a regulator means for adjusting said heating means, said regulator means being responsive to a signal, and each zone having a predetermined temperature to be maintained, comprising:

a. means for sensing the current temperature in each of said zones adjacent the end of a regular time interval,

b. means for comparing the last sensed temperature in each of said zones with said predetermined temperature level for each respective zone,

c. means for measuring the total heat input into each of said zones during said regular time interval,

d. first storage means for accumulating first data comprising all historical heat inputs representing the total heat input into each of said zones for each regular time interval during a preselected time period, said preselected time period comprising a plurality of said regular time interval and information on thermal lags in the furnace and interactions between the separate total heat inputs of the plurality of zones,

e. signal generating means for generating at least one new signal for at least one regulator means when at least one of said sensed temperatures differs from the respective predetermined temperature, said signal generating means having means for generating at least one new signal in response to a comparison of said temperature for each of said zones and said accumulated first data in said first storage means.

f. means for sending said at least one new signal to at least one regulator means to change the heat input into at least one of the zones to reduce any said temperature difference, and

g. means for adding data representative of the heat inputs to each of said zones, after said new signal has been sent, to said first accumulated data to be used after the next regular time interval.

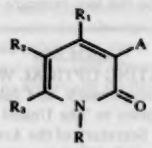
4,028,084

DERIVATIVES OF 3-CARBOXY PYRID-2-ONES

Patrick J. McNulty, Wyndmoor, and Harlow L. Warner, Hatboro, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

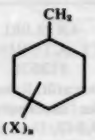
Filed Oct. 11, 1974, Ser. No. 513,988
Int. Cl.² C07D *213/80;* **A01N** *9/22*
U.S. Cl. 71—94 **8 Claims**

1. A compound of the formula:



wherein A is the group

wherein Y is a halogen, NH_2, OH or (C_1–C_7) alkoxy;
R_2 is hydrogen;
R_1 and R_3 are methyl or ethyl;
R is a group of the formula:



wherein X is hydrogen, NH_2, halogen, trifluoromethyl, nitro, or C_1–C_4) alkyl; and *n* is 0 to 2 and is physiologically acceptable salts.

8. A gametocidal herbidical or plant growth inhibiting composition which comprises 1) an agronomically acceptable carrier and 2) as the active ingredient an effective amount of a compound of claim **1.**

4,028,085

METHOD FOR MANUFACTURING SILICATE GLASSES FROM ALKOXIDES

Ian M. Thomas, Temperance, Mich., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 3, 1976, Ser. No. 655,025
Int. Cl.² C03B *5/16;* **C03C** *3/04*
U.S. Cl. 65—134 **4 Claims**

4. In a process for forming a carbon free silicate glass comprising: forming a hydrolysis reaction product of water, a silicon tetraalkoxide and a metal alkoxide, said reaction product comprising alcohol and hydrolyzable alkoxy groups and heating the product at a temperature and for a time sufficient to form a glass, the improvement comprising fractionally distilling said reaction product in the presence of free water with a fractionating column for a time sufficient to produce a column-head temperature of 100°C to remove all residual alcohol and hydrolyze residual alkoxy groups.

4,028,086

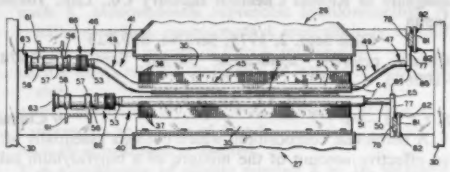
APPARATUS FOR BENDING AND TEMPERING GLASS SHEETS BY DIFFERENTIAL COOLING

Donald D. Rahrig, and Robert G. Revells, both of Toledo, Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Feb. 25, 1976, Ser. No. 661,368
Int. Cl.² C03B *23/02*
U.S. Cl. 65—273 **6 Claims**

1. Apparatus for bending and tempering glass sheets comprising: a heating furnace, a chilling section, and a cooling section arranged substantially in line with one another, a conveyor for supporting and conveying a glass sheet along a generally horizontal path successively through said furnace, chilling section and cooling section, means in said furnace for heating said sheet as it passes through said furnace to substantially the softening temperature of the glass, means in said

chilling section for directing a gaseous cooling medium under pressure against opposite surfaces of said sheet as it advances through said chilling section, means controlling the pressure of said cooling medium against said opposite surfaces to direct said cooling medium against the bottom surface of said sheet at a greater pressure than the pressure of said cooling medium directed against the upper surface thereof thereby to cool the bottom surface at a greater rate than said upper surface to cause said sheet to bend into a desired curvature, a series of driven rolls mounted in said chilling section above said conveyor, each of said rolls comprising a fixed core and a driven rotatable load supporting sleeve surrounding said core, each



of said rolls comprising a generally horizontally extending central portion in substantial parallelism with said conveyor but spaced thereabove a distance slightly greater than the thickness of the glass sheets to be conveyed thereby so that said advancing sheet normally contacts only said conveyor or said roll central portions at any given time during its passage therebetween, each of said rolls including opposite end portions having a common axis disposed above said central portion and substantially above said conveyor for providing adequate clearance for the mounting structure of said conveyor, and inclined portions connecting said end portions to said central portion.

4,028,087

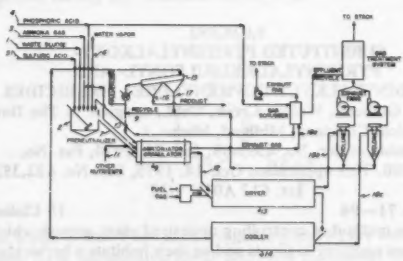
FERTILIZER PROCESSES INCORPORATING SCRUBBED FLUE GAS SLUDGE BYPRODUCT

James J. Schultz, and Vincent J. Van Pelt, both of Florence, Ala., assignors to Tennessee Valley Authority, Muscle Shoals, Ala.

Continuation of Ser. No. 660,054, Feb. 23, 1976, now Defensive Publication No. T955,002. This application Oct. 18, 1976, Ser. No. 733,395

Int. Cl.² C05F 7/00

U.S. Cl. 71—25 **8 Claims**



PROCESS FOR THE PRODUCTION OF SOLID GRANULAR FERTILIZER MATERIAL FROM SCRUBBER SLUDGE

1. A process for the production of solid granular fertilizer material wherein at least a portion of the plant nutrient values thereof are derived from waste sludge discharged from boiler flue gas scrubbing processes, which process comprises introducing into a preneutralizer vessel a stream of said waste sludge together with streams of ammonia, sulfuric acid, and/or phosphoric acid to form therein a partially neutralized ammonium sulfate and/or phosphate slurry, said waste sludge containing upwards to about 50 percent by weight water whereby the exothermic heat of reaction of the ammonia and mineral acids in said preneutralizer raises the temperature of the slurry therein sufficiently high to remove, by evaporation, substantial portions of excess water from said sludge; adjusting the relative amounts of ammonia to mineral acid introduced therein to maintain an N:P ratio in said preneutralizer in the range from 0.5 to about 0.7 for effecting fluidization of said slurry and easy transfer to a later-mentioned ammoniator-granulator; introducing a stream of said ammonium sulfate and/or phosphate slurry from said preneutralizer together with a stream of ammoniating fluid and particles of undersize product from a later-mentioned sizing step into the upper end of an inclined rotating drum; adjusting the relative amounts of said stream of ammoniating fluid and said slurry from said preneutralizer vessel to increase the N:P mole ratio of material introduced into said rotating drum to a range of about 1 to about 2; therein maintaining a bed of rolling discrete particles of ammonium sulfate and/or phosphate; recovering ammonia evolved from said rotating drum by passing the offgas therefrom through scrubbing means; returning the recovered ammonia from said scrubbing means to said preneutralizer; withdrawing granular ammonium sulfate and/or phosphate material from the lower end of said rotating drum; introducing said withdrawn material from said rotating drum to drying and sizing means; returning particles of predetermined size from said sizing means into the upper end of said drum and withdrawing from said sizing means granular particles of ammonium sulfate and/or phosphate product; said process being characterized by the fact that less than about 50 percent of the calcium sulfite contained in said waste sludge is converted to calcium sulfate.

4,028,088

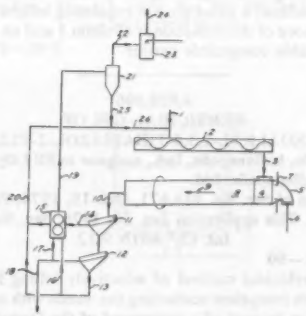
SOIL AMENDMENT AND METHOD

Donald C. Young, Fullerton, and P. Stanley Backlund, Anaheim, both of Calif., assignors to Union Oil Company of California, Brea, Calif.

Filed Dec. 17, 1975, Ser. No. 641,366

Int. Cl.² C05C 9/00

U.S. Cl. 71—28 **16 Claims**



1. The method of producing a multicomponent soil amendment containing at least about 40 weight percent of a particulate nitrifier selected from the group consisting of urea, ammonium nitrate and combinations thereof, at least about 10 weight percent calcium sulfate and at least one additional soil additive selected from elemental sulfur, phosphates, borates and compounds having cations selected from the group consisting of potassium, calcium, iron, magnesium, boron, manganese, copper, zinc and molybdenum, and combinations thereof, wherein said amendment comprises said nitrifier particles coated with a layer of the reaction product of calcium sulfate dihydrate and said nitrifier containing said additional soil additive, including the steps of mixing finely divided

calcium sulfate dihydrate, nitrifier particles having particle diameters between about 5 and about 30 mesh, an agronomically effective amount of said additional soil additive in particle form, and at least about 2 weight percent based on the total weight of said soil amendment of a powdered binder supplement selected from the group consisting of powdered urea, ammonium nitrate and combinations thereof having particle sizes below about 40 mesh, heating the resulting mixture under substantially anhydrous conditions to an elevated temperature sufficient to promote the endothermic reaction of said calcium sulfate dihydrate and nitrifier and below the melting point of said nitrifier, and produce said multicomponent soil amendment comprising said particulate nitrifier coated with a layer of the reaction product of said calcium sulfate dihydrate, said powdered binder supplement, and said nitrifier particles, said layer containing said additional soil additive.

4,028,089
PLANT GROWTH INFLUENCERS

Pierre Bocion, Winterthur; Wijitha De Silva, Schofflisdorf, and Pavol Winternitz, Greifensee, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

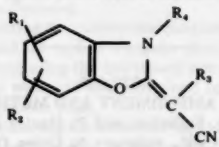
Filed Mar. 17, 1975, Ser. No. 559,195

Claims priority, application Switzerland, Mar. 22, 1974, 04038/74

Int. Cl.² A01N 9/22; C07D 263/54

U.S. Cl. 71—88 **30 Claims**

1. Compounds represented by the formula



wherein R_1 and R_2 each are hydrogen or a phenyl; R_3 is cyano; and R_4 is hydrogen or a lower alkyl having 1–4 carbons, and salts thereof.

14. A plant growth regulating composition containing as the active ingredient, a plant growth regulating effective amount of one or more of the compounds of claim 1 and an agriculturally acceptable compatible carrier.

4,028,090
HERBICIDAL USE OF 5-CYANOALKYL-1,3,4-THIADIAZOL-2-YLUREAS

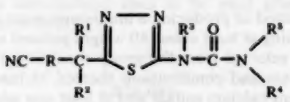
Tony Cebalo, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 514,671, Oct. 15, 1974, Pat. No. 3,959,303. This application Jan. 26, 1976, Ser. No. 652,278

Int. Cl.² A01N 9/12

U.S. Cl. 71—90 **8 Claims**

1. An herbicidal method of selectively killing herbaceous weeds which comprises contacting the weeds with an herbicidally effective amount of a compound of the formula:



wherein

R represents a carbon-carbon bond or

R^1, R^2, R^6 and R^7 independently represent hydrogen or C_1–C_2 alkyl,

provided that at least one of R^1, R^2, R^6 and R^7 must represent C_1–C_2 alkyl;

R^3 and R^4 independently represent C_1–C_3 alkyl; R^5 represents hydrogen, C_1–C_3 alkyl or C_1–C_3 alkoxy.

4,028,091
HERBICIDAL COMPOSITION

Kazuo Jikihara, Kakegawa; Shinichi Iori, Ogasa; Ichiro Kimura, Shizuoka, and Kyoichi Adachi, Yaizu, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd., Tokyo, Japan

Filed Sept. 2, 1975, Ser. No. 609,725

Claims priority, application Japan, Sept. 2, 1974, 49-100695

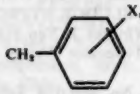
Int. Cl.² A01N 9/12

U.S. Cl. 71—94 **9 Claims**

1. A herbicidal composition, which consists essentially of:

an effective amount of the mixture of a bipyridylium salt selected from the group consisting of the dichloride and dibromide salts of 1,1′-dimethyl-4,4′-bipyridylium and 1,1′-ethylene-2,2′-bipyridylium and a thiocarbamate having the formula

wherein R and R_1 each represent a lower alkyl group or which in combination with each other and with the N atom can form a hexamethyleneimino ring, R_2 represents



and X represents a halogen atom of a lower alkyl group, and *n* represents 0, 1 or 2, wherein the ratio of said bipyridylium salt to said thiocarbamate is 1:1–4.

4,028,092
SUBSTITUTED PYRIDINYLALKOXY-, PYRIDINYLALKYLSULFONYL- AND PYRIDINYLALKYLTHIOPHENYLUREA HERBICIDES

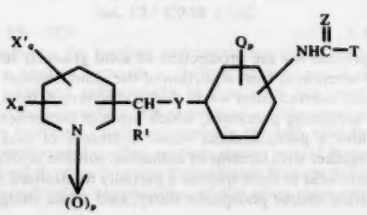
Alin H. Gulbenk, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 435,608, Jan. 22, 1974, Pat. No. 3,931,200. This application Oct. 14, 1975, Ser. No. 622,352

Int. Cl.² A01N 9/22

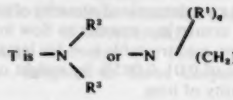
U.S. Cl. 71—94 **15 Claims**

1. The method of controlling undesired plant growth which comprises applying to plants and/or their habitats a herbicidally-effective amount of a compound of the formula:



-continued

wherein



each X independently represents bromo, chloro, fluoro or iodo;

each X′ independently represents trichloromethyl, NH_2, trifluoromethyl, cyano, methyl, methylthio or methoxy;

n represents an integer of 0 to 4, inclusive;

each *q* independently represents an integer of 0 to 2, inclusive;

each *p* independently represents an integer of 0 or 1;

r represents an integer of 4 to 5;

each R^1 is hydrogen or methyl;

Y is a chalcogen of atomic number 8 to 16, inclusive or —SO2;

Q is methyl, ethyl or halo;

Z is a chalcogen of atomic number 8 to 16, inclusive;

R^2 represents hydrogen, alkyl of from 1 to 4 carbon atoms, inclusive or an alkoxy group of from 1 to 4 carbon atoms, inclusive; and

R^3 represents an alkyl group of from 1 to 4 carbon atoms, inclusive.

4,028,093

META-BIS ANILIDE DERIVATIVES AND THEIR UTILITY AS HERBICIDES

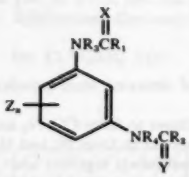
Eugene G. Teach, El Cerrito, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 179,224, Sept. 9, 1971, Pat. No. 3,941,581, which is a division of Ser. No. 20,104, March 16, 1970, abandoned, which is a continuation-in-part of Ser. No. 741,267, July 1, 1968, abandoned, which is a continuation-in-part of Ser. No. 659,865, Aug. 11, 1967, abandoned. This application Oct. 2, 1975, Ser. No. 619,113

Int. Cl.² A01N *9/20*

U.S. Cl. 71—118 **8 Claims**

1. A method for controlling the growth of vegetation which comprises applying to the area where control of said vegetative growth is desired, a growth controlling amount of a compound having the formula



in which X and Y are each oxygen, R_3 and R_4 are each hydrogen, R_2 is halogenated lower alkyl and R_1 is alkyl containing from 1 through about 10 carbon atoms, inclusive, and n is 0.

4,028,094

STAINLESS STEEL POWDER

Orville W. Reen, New Kensington, and Donald J. McMahon, Export, both of Pa., assignors to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Filed Oct. 29, 1975, Ser. No. 626,945

Int. Cl.² B22D *23/08*; C22C *38/44*

U.S. Cl. 75—.5 BA **4 Claims**

1. Atomized, prealloyed stainless steel powder consisting essentially of, by weight, up to 0.03% carbon, up to 2.0% manganese, up to 0.05% phosphorus, up to 0.04% sulfur, up to 2.0% silicon, 17.5 to 18.0% chromium, 10.0 to 14.0% nickel, 2.5 to 3.0% molybdenum, balance iron and residuals; said powder having an apparent density of at least 2.0 g./cu.cm.; said powder being suitable for use in the manufacture of sintered powder parts requiring superior corrosion resistance to the chloride ion.

4,028,095

FREE FLOWING POWDER AND PROCESS FOR PRODUCING IT

John M. Laferty, Jr., Wheat Ridge, Colo.; Joseph E. Ritsko, Towanda, and David J. Port, Athens, both of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Division of Ser. No. 594,734, July 10, 1975, Pat. No. 3,973,948, and a continuation-in-part of Ser. No. 414,976, Nov. 12, 1973, abandoned. This application Mar. 31, 1976, Ser. No. 672,502

Int. Cl.² C22C *1/04*

U.S. Cl. 75—.5 AB **7 Claims**

1. Process for producing a free flowing powder from finely divided particles of an inorganic material having a melting point about 500° C, the process comprising producing agglomerates of the particulate material by spray drying a slurry of the material in a liquid, the liquid comprising a solution of binder in a volatile solvent, characterized in that at least 50 percent by weight of the binder consists essentially of at least one water soluble metallic ammonium complex of an element selected from the group consisting of molybdenum and tungsten whereby upon heating in a reducing atmosphere the ammonium complex decomposes to base metal and at least one volatile product.

4,028,096

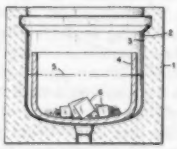
METHOD OF MELTING METALS TO REDUCE CONTAMINATION FROM CRUCIBLES

John G. Banker, Kingston, and Hubert L. Wigginton, Oak Ridge, both of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed May 13, 1976, Ser. No. 686,447

Int. Cl.² C22B *60/02*

U.S. Cl. 75—20 R **5 Claims**



1. A method of reducing the contamination of a metallic charge from a crucible during melting operations comprising:

a. first providing the interior surface of said crucible with a ceramic coating substantially non-reactive with said metallic charge;

b. disposing within said coated crucible a liner formed from at least a portion of said metallic charge, said liner being substantially concentric to the inner surface of said crucible and having an outside diameter less than the inside diameter of said coated crucible such that as the crucible is heated the liner expands and presses against said ceramic coating prior to melting; and

c. heating said crucible to a temperature sufficient to completely melt said liner whereby said ceramic coating is contact with molten metallic charge.

4,028,097
SELF-LUBRICATING IRON BASE ALLOY

Yoshiyuki Mizutani; Masaaki Tada, and Yasuo Imada, all of Nagoya, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Nagoya, Japan

Continuation-in-part of Ser. No. 447,109, Feb. 28, 1974, abandoned. This application Feb. 3, 1976, Ser. No. 654,689
Claims priority, application Japan, Mar. 2, 1973, 47-25485
Int. Cl.² C22C *38/12, 38/60*
U.S. Cl. 75—123 AA 3 Claims

1. A self-lubricating wear-resistant iron base alloy consisting essentially of 15 to 30% by weight of molybdenum, 1 to 5% by weight of an element selected from the group consisting of sulphur and selenium, and 0.5 to 1.2% by weight of carbon, the balance being iron.

4,028,098
CRYOGENIC STEEL

Werner Pepperhoff, Duisburg-Huckingen, and Friedhelm Richter, Mulheim (Ruhr), both of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

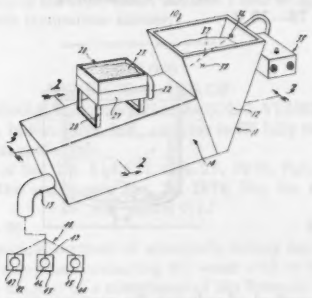
Continuation of Ser. No. 447,866, March 4, 1974, abandoned. This application June 30, 1975, Ser. No. 591,594
Claims priority, application Germany, Mar. 6, 1973, 2311739
Int. Cl.² C22C *38/24, 38/38*
U.S. Cl. 75—126 B 1 Claim

1. In a method comprising conducting cryogenic liquids through pipes or tubes, the improvement comprising said pipes or tubes being fabricated from a steel consisting of 20% to 30% Mn, 5% to 12% Cr and non-zero quantities of up to about 0.5%C, up to 1.5% Si and up to 0.5%V.

4,028,099
CONTINUOUS STREAM - INCLINED TROUGH TREATMENT OF DUCTILE IRON

Gerald S. Cole, Dearborn; Bela V. Kovacs; Robert A. Sensoli, both of Dearborn Heights, and Herschel B. Smartt, Plymouth, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Apr. 17, 1975, Ser. No. 569,029
Int. Cl.² C22C *33/08, 33/00*
U.S. Cl. 75—130 B 14 Claims

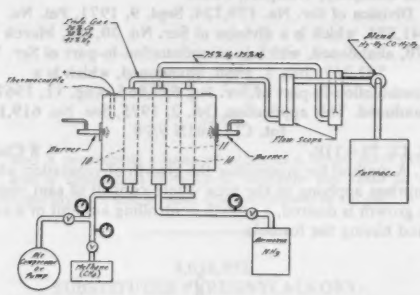


1. A method of producing treated iron, comprising:
a. providing an inclined and enclosed course through which a molten stream of treatable iron may flow, said enclosed course having an expansion chamber interposed therein with an inlet and an outlet respectively connecting said course to said chamber while permitting said iron to flow therethrough, at least one of said inlet or outlet being controllable in aperture size, said chamber having another opening into which and through which a graduated supply of treating agent may be injected to contact, react, mix and expand with said iron flow, said chamber being comprised of refractory material substantially unreactive with the iron flow or agent and said chamber being maintained in a gas-tight condition, said course further being arranged so that the outflow from said expansion chamber is directed immediately to a mold solidifying said treated iron substantially independent of time and temperature variations,
b. introducing a predetermined quantity of molten treatable iron to said course in a manner to flow into and through said chamber, said treatable iron having a sulfur content in the range of 0.01–0.015% by weight of the predetermined quantity of iron,
c. simultaneous with flow through said chamber, injecting a predetermined and continuous supply of treating agent through said another opening, said treating agent being a modifier selected from the group consisting of a rod of solid magnesium, magnesium ferro-silicon in the form of either lumps or pellets and magnesium vapor, and
d. adjusting the aperture of said controllable inlet or outlet so that a predetermined collection of iron is developed and maintained in said chamber for a substantial portion of said iron flow therethrough whereby reaction between said agent and iron can create turbulence to promote further reaction and uniform distribution of products of said iron treatment.

4,028,100
HEAT TREATING ATMOSPHERES

Henry F. Latva, Dearborn, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Division of Ser. No. 361,082, May 17, 1973, Pat. No. 3,891,473. This application Oct. 15, 1974, Ser. No. 514,352
Int. Cl.² B22F *9/00*; C21P *1/76*
U.S. Cl. 75—224 20 Claims



1. A method of sintering steel powder metal compacts, comprising:
combusting methane to form CO, N_2 and H_2 constituents,
dissociating ammonia to form N_2 and H_2 constituents,
blending the constituents together and
subsequently introducing the blended constituents into a sintering environment containing the compact while heating the compact at sintering temperatures.

9. A method of sintering comprising:
providing an endothermic generator and an ammonia dissociator,
passing a flow of methane into the generator and a flow of ammonia into the dissociator,
regulating the flow of the two gases relative to each other,
combusting the methane in the generator and dissociating the ammonia in the dissociator,
providing a steel powder metal compact in a sintering environment,
passing the combusted constituents out of the generator,
passing the dissociated constituents out of the dissociator,
mixing constituents together, and

introducing the mixed constituents into the sintering environment of the compact.

4,028,101

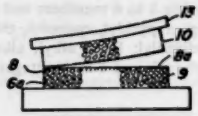
MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN

David A. Buckley, Rochester, and Frank G. Belli, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 499,716, Aug. 22, 1974. This application July 23, 1975, Ser. No. 598,310

Int. Cl.² G03G *5/00*

U.S. Cl. 96—1.5 **5 Claims**



1. An imaged member comprising:

a first layer of softenable material containing a background of migration material, said first layer of softenable material overlying a second layer of softenable material, said softenable material being either electrically photosensitive or substantially electrically insulating, said second layer of softenable material containing migration particles distributed in depth in said second layer of softenable material in image pattern configuration, at least one of said layers of softenable material containing a surface skin located at the entire surface of at least one of said softenable layers and at the interface between said layers of softenable material, said surface skin formed by exposing said surface of at least one of said layers of softenable material to hardening radiation sufficient to form said surface skin having a thickness from about 0.01 to about 0.5 micron.

4,028,102

DIAMINE CONDENSATION PRODUCTS IN DOUBLE LAYER PHOTOCONDUCTIVE RECORDING ELEMENTS

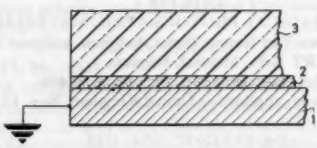
Jürgen Rochlitz, Wiesbaden, and Reinhard Zunker, Kelkheim, both of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Division of Ser. No. 519,650, Oct. 31, 1974, abandoned. This application Dec. 5, 1975, Ser. No. 637,929

Claims priority, application Germany, Nov. 3, 1973, 2355075

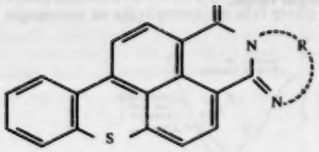
Int. Cl.² G03G *5/06*

U.S. Cl. 96—1.5 **9 Claims**

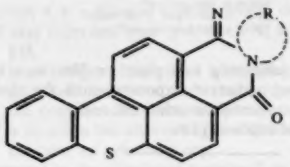


1. An electrophotographic recording material comprising an electrically conductive carrier material having a photoconductive double layer thereon composed of an organic pigment layer of a thickness in the range of about 0.005 to about 2μm and a transparent top layer of organic insulating materials having at least one charge transfer compound in which the organic pigment layer is composed of a compound of at least one of the formulae

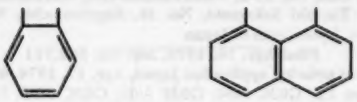
I



II



wherein R is one of the groups



which may be substituted.

4,028,103

PROCESSING COMPOSITIONS FOR COLOR TRANSFER PROCESSES COMPRISING ALKALI METAL FLUORIDES AND OXALATES

David Eugene Hannie, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 12, 1976, Ser. No. 675,661

Int. Cl.² G03C *7/00, 5/54, 5/30, 1/40*

U.S. Cl. 96—29 D **16 Claims**

13. In a process for producing a photographic transfer image in color from an imagewise-exposed photosensitive element comprising a support having thereon at least one photosensitive silver halide emulsion layer having associated therewith a dye image-providing material; said process comprising treating said photosensitive element with an alkaline processing composition in the presence of a silver halide developing agent to effect development of each of said exposed silver halide emulsion layers, said alkaline composition having a pH of at least about 11, whereby an imagewise distribution of dye image-providing material is formed as a function of development and at least a portion of it diffuses to a dye image-receiving layer to provide said transfer image, the improvement comprising including in said alkaline processing composition a salt which is an alkali metal fluoride or an alkali metal oxalate.

4,028,104

INFRARED HOLOGRAM RECORDING METHOD

Andrejs Graube, Venice, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Apr. 21, 1975, Ser. No. 569,737

Int. Cl.² G03C *5/04, 5/50*

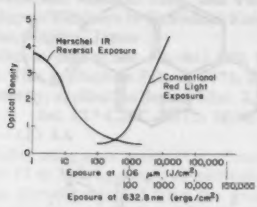
U.S. Cl. 96—27 H **7 Claims**

1. A method of fabricating infrared holograms from silver halide emulsion photographic plates or films comprising, first exposing said plates to visible light, second uniformly exposing said plates or films to holographic infrared radiation and developing said exposed plates or films.

5. A method of fabricating infrared holograms comprising the steps of:

a. uniformly exposing a photographic plate or film, comprised of a silver halide emulsion, to visible light whereby

the sensitivity of said film or plate is extended to 1 + 0.25 μm wavelength range,


Herschel IR Reversal Exposure
Conventional Red Light Exposure
Optical Density
Exposure at 1.06 μm (J/cm²)
Exposure at 632.8 nm (ergs/cm²)

b. subsequently subjecting said plate or film to a holographic infrared radiation exposure until the desired optical density reduction is achieved, and

c. developing said exposed plate.

4,028,105

COLOR CORRECTION PROCESS FOR COLOR PRINTING USING ELECTROLUMINSCENT ELEMENT

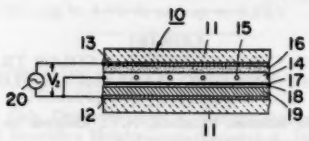
Yoshio Ono, No. 25-2, Nishirendaino-cho, Murasakino, Kita, and Takashi Sakamoto, No. 16, Sagasono-cho, Narutaki, Ukyo, Kyoto, both of Japan

Filed Apr. 16, 1975, Ser. No. 568,711

Claims priority, application Japan, Apr. 17, 1974, 49-42292

Int. Cl.² G03C *7/04*; G03F *1/00*; G03C *1/92*, *7/00*

U.S. Cl. 96—3 D **4 Claims**



1. In a process for making a color separation record for color printing including the steps of:

a. applying a light image onto the surface of a photosensitive material with a color filter for color separation;

b. placing an electroluminescent member in close proximity to the upper surface of the photosensitive material; the member having the property of the lower surface thereof emitting light in response to the amount of light impinged on the upper surface thereof; the member also having the property of radiating onto the surface of the photosensitive material a light image which is the negative of the light image applied onto the upper surface of the member; and exposing the said electroluminescent member to the said light image through a color correction filter, and then

c. exposing the said photosensitive material to a reversal of the said light image radiated from the electroluminescent member when said member is in registration with the photosensitive material.

4,028,106

METHOD FOR DEVELOPING AN EXPOSED SILVER HALIDE COLOR PHOTOSENSITIVE MATERIAL

Haruo Hori; Shoji Kikuchi; Hajime Wada; Sadatosi Kobayasi, and Takaya Endo, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

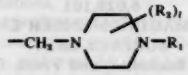
Filed Nov. 4, 1975, Ser. No. 628,762

Claims priority, application Japan, Nov. 5, 1974, 49-127314

Int. Cl.² G03C *7/00*, *1/40*

U.S. Cl. 96—55 **7 Claims**

1. A method for developing an imagewise exposed silver halide color photosensitive material which comprises conducting the development in the presence of at least one of p-phenylenediamines and a phenol or naphthol cyan coupler having, in the active position thereof, the following split-off group:



wherein R_1 is selected from the group consisting of alkyl, alkenyl, aryl, acyl, formyl, amino carbonyl group or a heterocyclic ring, said group and said ring may be substituted with a member selected from the group consisting of nitro; hydroxyl; amino; sulfo; substituted or unsubstituted alkyl, aryl, heterocyclic ring, alkoxy, arylazo, acylamino, or carbamoyl, said heterocyclic ring having 5 to 6 members and is selected from the group consisting of pyridyl, quinolyl, thienyl, piperidyl, imidazolyl and oxydiazolyl; R_2 is alkyl, alkenyl, aryl, acyl, formyl, or aminocarbonyl; and l is an integer of 0 to 4 inclusive.

4,028,107

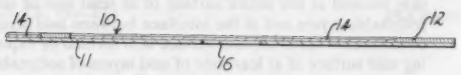
PROCESS AND APPARATUS FOR PRODUCING PRINTED MATTER

John C. Henley, III, 2345 Crest Road, Birmingham, Ala. 35223

Filed May 19, 1971, Ser. No. 144,885

Int. Cl.² G09F *1/10*; G03C *5/04*

U.S. Cl. 96—41 **4 Claims**



1. The process of printing a plurality of imposed pages comprising:

a. manufacturing proofs of each page on sheets of material on which the matter to be printed is positioned in predetermined areas thereof,

b. confining said proof sheets in a co-planar and predetermined relation to each other by engaging the sheets solely along selected ones of the sheet thickness edges thereof, whereby the entire upper surfaces of said sheets are unobstructed, and

c. simultaneously reproducing on a single surface the subject matter of all of said proof sheets while maintaining them confined and related to each other as set forth in (b) above.

4,028,108

FREE-RADICAL PHOTOGRAPHIC MATERIAL

Freddy Ghisleen Van Royen, Ranst, Belgium, assignor to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Nov. 10, 1975, Ser. No. 630,496

Claims priority, application United Kingdom, Nov. 12, 1974, 48943/74

Int. Cl.² G03C *5/24*, *1/52*

U.S. Cl. 96—48 R **11 Claims**

1. A photographic material containing in a layer on a support a mixture of the following compounds:

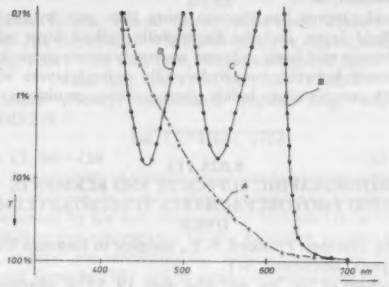
1. at least one ultraviolet-sensitive organic polyhalogen compound capable of producing a dye salt with a spiropyran compound on exposure with ultraviolet radiation,

2. at least one spirobi(arylpyran) compound,

3. N-vinylcarbazole,

4. at least one compound selected from the group consisting of furan, furylacrylic acid and 2-carboxyfuran,

5. at least one compound selected from the group consisting of 1-phenyl-3-pyrazolidinone, benzalphenylhydrazone and 1,5-dimethyl-2-phenyl-4-pyrazolin-3-one, and



6. a polymeric compound containing N-vinylcarbazole units.

4,028,109

PHOTOGRAPHIC TRANSPARENCY FOR PRODUCING A LENTICULAR ARRAY

Robert L. Lamberts, Penfield, and Nelson R. Nail, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 455,759, March 28, 1974, Pat. No. 3,984,242. This application Nov. 7, 1975, Ser. No. 629,948

Int. Cl.² G03F *5/00;* **G03C** *5/00*

U.S. Cl. 96—116 **2 Claims**

1. A photographic transparency for use in photographically producing an improved screen element having an array of substantially identical lenticules of predetermined profile, said transparency comprising a support, a layer of developed photosensitive emulsion extending over one surface of said support and defining one or more lenticule exposing sectors of said transparency, each such exposing sectors being subdivided into a plurality of profile defining areas which are of the same size and shape and located contiguously in a grid array within said sector, each of said profile defining areas having a separate, substantially uniform optical density throughout, the relative optical densities, and the relative locations within such sector of said profile defining areas, being designed to facilitate recording in a photographic emulsion, of exposure pattern for forming a lenticule of predetermined profile.

4,028,110

DEVELOPMENT OF EXPOSED LITH-EMULSIONS

Jules Robert Berendsen, Deurne; Robert Joseph Pollet, Vremde; Herman Adelbert Philippaerts, Edegem; Francis Jeanne Sels, Kontich, and Jozef Frans Willems, Wilrijk, all of Belgium, assignors to AGFA-GEVAERT, N.V., Mortsel, Belgium

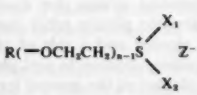
Filed Feb. 21, 1975, Ser. No. 552,037

Claims priority, application United Kingdom, Feb. 28, 1974, 9106/74

Int. Cl.² G03C *5/30, 1/28*

U.S. Cl. 96—66.3 **11 Claims**

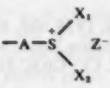
1. A method of developing an exposed photographic element including a lith silver halide emulsion containing at least about 50 mole % of silver chloride, at least about 5 mole % of silver bromide and from 0 to 5 mole % of silver iodide wherein during development a sulphonium compound corresponding to the formula:



wherein:

each of X_1 and X_2 represents an alkyl group at least one of which carries a hydroxy, carboxy, sulpho or cyano group,

R represents an alkyl group, an aryl group or the group



wherein A is a divalent organic group, or

R may represent hydrogen when X_1 and X_2 are hydroxyalkyl,

n is an integer of at least 1 when the compound is a disulphonium compound and is an integer of at least 2 when the compound is a monosulphonium compound, and

Z is an anion but does not exist when one of X_1 and X_2 itself contains an anionic group,

is present in the developer employed or in the photographic element in an amount sufficient to increase the initial rate of development and to stabilize the speed upon prolonged development.

4,028,111

LIGHT-SENSITIVE LITHOGRAPHIC PRINTING PLATE

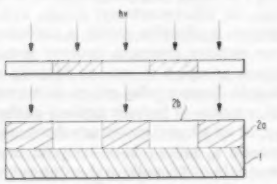
Masayuki Iwasaki; Hiroshi Misu, both of Minami-ashigara, and Shizuo Miyano, Odawara, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Feb. 25, 1975, Ser. No. 552,902

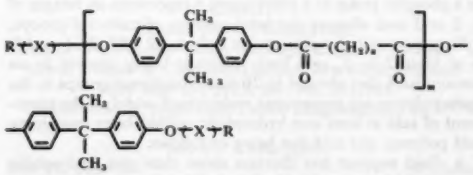
Claims priority, application Japan, Feb. 25, 1974, 49-22133

Int. Cl.² G03C *1/52, 1/68*

U.S. Cl. 96—75 **10 Claims**



1. A light-sensitive lithographic printing plate comprising a support with a hydrophilic surface having thereon a light-sensitive layer comprising a light-sensitive polyester, containing o-quinonediazide groups as terminals, represented by the formula:



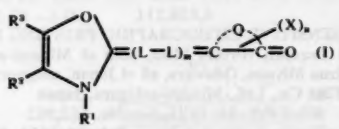
wherein X represents a sulfonyl group or a carbonyl group; wherein R represents an aromatic o-quinonediazide group in which the aromatic ring can be substituted with a substituent which does not hinder the photolysis of said o-quinonediazide group; n represents an integer of 2 to 10; and m represents an integer of 2 to 50.

4,028,112
PHOTOGRAPHIC SENSITIVE MATERIALS HAVING A DYED LAYER

Akira Sato; Tadashi Ikeda; Tohru Sueyoshi; Yasuharu Nakamura, and Takeo Shimada, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed May 9, 1975, Ser. No. 575,878
Claims priority, application Japan, May 10, 1974, 49-51927
Int. Cl.² G03C 1/84
U.S. Cl. 96—84 R **6 Claims**

1. A silver halide photographic sensitive element comprising a support having thereon at least one silver halide photosensitive emulsion layer and at least one hydrophilic colloid layer containing (1) a basic polymer which is a water-soluble high molecular weigth material containing basic groups in the main chain thereof or in a branched chain thereof and which is compatible with gelatin, said polymer being a polymer of an ethylenically unsaturated compound having a dialkylaminoalkyl ester group, a maleic acid anhydride copolymer or a derivative thereof, a polymer produced by reacting a polyvinylalkylketone with aminoguanidien, a polymer containing a 2-methylimidazole nucleus in a side chain thereof, and addition polymer of bisacrylamid and a secondary diamine or the quaternary salt thereof, or a copolymer including polyvinylpyridine or polyvinylquinoline, and (2) 80 to 800 mg per m^2 of said element of a merocyanine dye represented by the following formula (I):



wherein R^1 represents an alkyl group having 1 to 20 carbon atoms, a substituted alkyl group having 1 to 20 carbon atoms and containing 1 or more of a halogen atom, a cyano group, a carboxy group, an alkoxycarbonyl group, a sulfo group, a sulfoalkoxy group, a phospho group, a carbamoyl group, an acyl group, an acyloxy group, a hydroxy group, an alkoxy group, an amino group, a mono- or bicyclic aryl group, a mono- or bicyclo heterocyclic group, a momo- or bicycle aryloxy group, a mono- or bicyclic aryloxy-carbonyl group, an alkenyl group, or an alkynyl group as substituents; each of R^2 and R^3 represents a mono-, bi-or tricyclic aryl group or a substituted mono, bi-or tricyclic aryl group substituted with 1 or more of an alkyl group, an alkoxy group, an alkylthio group, a halogen atom, a nitro group, a cyano group, a sulfo group, a phospho group, a carboxy group, an alkoxycarbonyl group, an amino group, an aralkyl group, a mono- or bicyclic aryl group, or a mono- or bicyclic aryloxy group as substituents; L represents a methine group; *m* represents an integer of 0, 1, 2 or 3; Q represents the group of atoms necessary to complete a ketomethylene group containing nucleus; X represents a carboxy group, a sulfo group, a phospho group or a group containing 1 or more of a carboxy group, a sulfor group or a phospho group as a substituent; *n* represents an integer of 1, 2 or 3 and wherein the total number of carboxyl groups, sulfo groups and phospho groups included R^1, R^2, R^3, L and X is at least 2 to 5, said basic polymer being present in an amount such that about 4 to 20 basic functional groups in the basic polymer are present per molecule of said dye, the placement of said at least one hydrophilic colloid layer containing said polymer and said dye being as follows:

A. Said support has thereon more than one hydrophilic colloid layer, and said silver halide photosensitive emulsion layer is a first hydrophilic collied layer which is located between said support and second hydrophilic collied layer which contains said basic polymer and said merocyanine dye,

B. said support has thereon more than one hydrophilic colloid layer, and the hydrophilic colloik layer which contains said basic polymer and said merocyanine dye is located between said support and a hydrophilic colloid layer which contains said silver halide photosensitive emulsion, or

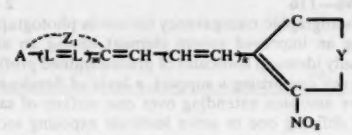
C. said support has thereon more than one hydrophilic colloid layer, and the hydrophilic colloid layer which contains said basic polymer and said merocyanine dye is located between two hydrophilic colloid layers which each contain silver halide photosensitive emulsions.

4,028,113
PHOTOGRAPHIC SUPPORTS AND ELEMENTS UTILIZING PHOTOBLEACHABLE O-NITROARYLIDENE DYES

David M. Sturmer, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 443,654, Feb. 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 260,618, June 7, 1972, abandoned, which is a continuation-in-part of Ser. No. 176,681, Aug. 25, 1971, abandoned. This application Oct. 30, 1975, Ser. No. 627,427
Int. Cl.² G03C 1/89, 1/72
U.S. Cl. 96—84 R **19 Claims**

1. A photographic element comprising a support and, coated thereon, a radiation-sensitive image recording means, the improvement comprising an otherwise transparent photographic film support having incorporated therein a photobleachable dye which has the following formula:



wherein:

a. *K* represents 0 or 1;

b. *m* represents 0 or 1;

c. each L represents a methine group;

d. A represents oxygen, sulfur or N-R_1;

e. R_1 represents an alkyl group, an alkenyl group or an aryl group;

f. Z_1 represets the nonmetallic atoms necessary to complete a cyanine dye type heterocyclic ring whose skeletal atoms consist of the oxygen, sulfur or nitrogen atom of A, carbon atoms and one other atom chosen from the group consisting of carbon, oxygen, nitrogen, selenium and sulfur atoms; and

g. Y represents the atoms necessary to complete a phenyl or naphthyl group.

4,028,114
PHOTOCHEMICAL SYSTEM FOR COATING THE LUMINESCENT SCREEN OF A COLOR TELEVISION PICTURE TUBE

Uwe Viohl, Aichschiess, Germany, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Mar. 10, 1975, Ser. No. 557,220
Claims priority, application Germany, Mar. 12, 1974, 2411869
Int. Cl.² G03C 1/66, 5/36
U.S. Cl. 96—93 **1 Claim**

1. In a photochemical system for coating luminescent screens of color television picture tubes containing a photosensitive polyvinyl alcohol and a salt of chromic acid, the improvement comprising addition to said photochemical system of a polyether alcohol of the general formula $HOCH_2[CH_2OCH_2]_nCH_2OH$ wherein the quantity *n* has a valve of from 2 to 3.

4,028,115
SILVER HALIDE PHOTOGRAPHIC EMULSION SENSITIZED TO RED WITH FOUR CARBOCYANINE DYES

Masanao Hinata; Haruo Takei; Akira Sato; Atsuo Iwamoto, and Jun Hayashi, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 26, 1976, Ser. No. 717,837

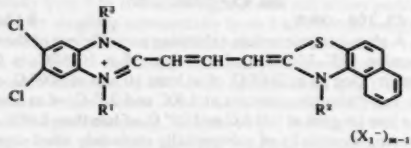
Claims priority, application Japan, Aug. 26, 1975, 50-103228

Int. Cl.² G03C 1/14

U.S. Cl. 96—124 **13 Claims**

1. A spectrally sensitized silver halide photographic emulsion containing, in combination, at least one sensitizing dye represented by the following general formula (I), at least one sensitizing dye represented by the following general formula (II), at least one sensitizing dye represented by the following general formula (III) and at least one sensitizing dye represented by the following general formula (IV):

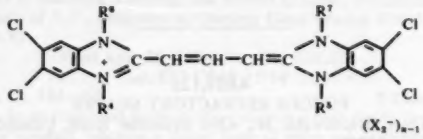
general formula (I)



$(X_1^-)_{m-1}$

in which R^1 and R^2 each represents an alkyl group R^3 represents an alkyl group, X_1 represents an acid anion, and m is 1 or 2, m being 1 in the case that the dye forms an inner salt (betaine-like structure);

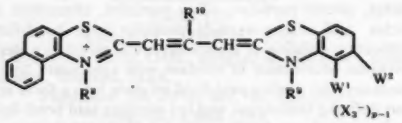
general formula (II)



$(X_2^-)_{n-1}$

in which R^7 represents an alkyl group, R^4, R^5 and R^6 each represents an alkyl group, X_2 represents an acid anion, and n is 1 or 2, n being 1 in the case that the dye forms an inner salt (betaine-like structure);

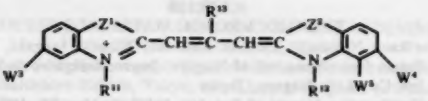
general formula (III)



$(X_3^-)_{p-1}$

in which R^8 and R^9 each represents an alkyl group, R^{10} represents an alkyl group, an aryl group, a furyl group or a thienyl group, W^2 represents a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, a hydroxy group, an alkoxycarbonyl group, an acyl group, an acylamino group or a phenyl group, and W^2 may form a benzene nucleus in conjunction with W^1, W^1 represents a hydrogen atom or an atomic group required to form a benzene nucleus in conjunction with W^2, X_3 represents an acid anion, and p is 1 or 2, p being 1 in the case that the dye forms an inner salt (betaine-like structure);

general formula (IV)



in which Z^1 and Z^2 each represents a sulfur atom or a selenium atom, W^3 and W^4 each represents a hydrogen atom, an alkyl group, an alkoxy group, a hydroxy group, a halogen atom, a phenyl group, an acyl group, an acylamino group or an alkoxycarbonyl group, W^4 may form a benzene nucleus in conjunction with W^5 only when W^1 and W^2 in general formula (III) form a benzene nucleus, W^5 represents a hydrogen atom or an atomic group required to form a benzene nucleus in conjunction with W^4, R^{11} and R^{12} each represents an alkyl group or a substituted alkyl group having a sulfo group, at least one of R^{11} and R^{12} representing a substituted alkyl group having a sulfo group, and R^{13} represents alkyl group; and

when the dye represented by general formula (I), (II), (III) or (IV) is an anionic dye, it has a cation as a counter ion.

4,028,116
SOLUTION FOR ELECTROLESS CHROME ALLOY PLATING

Curtis E. Cedarleaf, 4826 Spring Creek Road, Rockford, Ill. 61111

Filed Dec. 1, 1972, Ser. No. 311,437

Int. Cl.² C23C 3/02

U.S. Cl. 106—1 **5 Claims**

1. An aqueous solution for electroless or catalytic deposition of chromium alloy consisting essentially of an organic chromium salt having a concentration between about 10 to 40 grams per liter, a nickel salt having a concentration of not less than about 2 grams per liter and not more than about one-fifth the concentration of the chromium salt; a hypophosphite reducing agent having a concentration of between 5 and 30 grams per liter; a buffering compound capable of maintaining the pH of the solution between 3.5 and 6; and a complexing agent comprising a water soluble salt of oxalic acid in concentration about 1 to 5 grams per liter.

4,028,117
CORROSION INHIBITORS

Nicholas Warrington Moat, Hawley, England, assignor to Edwin Cooper & Company Limited, Bracknell, England

Filed May 29, 1975, Ser. No. 581,744

Claims priority, application United Kingdom, May 30, 1974, 23986/74

Int. Cl.² C09D 5/08

U.S. Cl. 106—14 **8 Claims**

1. A mixture suitable for use as a corrosion inhibitor, which mixture comprises (a) from 1.8 to 25 parts by weight dimerised unsaturated fatty acid said fatty acid containing 8–20 carbon atoms and (b) 1 part by weight of an ethoxylated alkyl phenol, said phenol having an average of about 3–4 ethylene oxide units and said alkyl containing 4–16 carbon atoms and wherein said mixture provides a WSIM number of at least 60.

4,028,118
THERMOCHROMIC MATERIALS

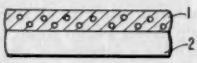
Norikazu Nakasuji; Takashi Kataoka; Hiroshi Inagaki, and Sunao Nakashima, all of Nagoya, Japan, assignors to Pilot Ink Co., Ltd., Nagoya, Japan

Continuation-in-part of Ser. No. 365,330, May 30, 1973, abandoned. This application Dec. 23, 1975, Ser. No. 643,656

Claims priority, application Japan, May 30, 1972, 47-53649; July 27, 1972, 47-75355; July 29, 1972, 47-76132; Sept. 14, 1972, 47-92378; Dec. 2, 1972, 47-120936; Jan. 19, 1973, 48-8801; Feb. 9, 1973, 48-16856; Feb. 16, 1973, 48-19602; Apr. 2, 1973, 48-38117

Int. Cl.² C09D *11/06, 11/12*

U.S. Cl. 106—21 **9 Claims**



1. A reversible thermochromic material comprising (A) from about 1% to about 20% by weight of one or more electron-donating, chromatic organic compounds selected from the group consisting of diaryl phthalides, polyaryl carbinols, leuco auramines, lactum leuco compounds, indolines, spiropyrans and fluoranes having a molecular weight of from about 350 to about 1...; (B) from about 2% to about 30% by weight of one or more compounds having a phenolic hydroxyl group and a molecular weight of from about 200 to about 800; (C) from about 10% to about 90% by weight of one or more compounds selected from the group consisting of lauryl alcohol, myristyl alcohol, cetyl alcohol, stearyl alcohol, docosyl alcohol, oleyl alcohol and mixtures thereof; and (D) the balance to make 100% being one or more compounds selected from the group consisting of octyl caprylate, decyl caprylate, octyl caprate, decyl caprate, cetyl caprate, stearyl caprate, butyl laurate, octyl laurate, lauryl laurate, stearyl laurate, butyl myristate, decyl myristate, myristyl myristate, cetyl myristate, octyl palmitate, butyl stearate, decyl stearate, lauryl stearate, stearyl stearate, 12-hydroxy stearic acid triglyceride and mixtures thereof, said component (C) and (D) controlling the temperature and sensitivity of coloration/decoloration of said thermochromic material undergoing reversible metachromatism at a temperature within the range of from about −40° to about 80° C.

4,028,119
PROCESS FOR PREPARING RESINS FOR USE IN PRINTING INK

Koichi Yamada; Teijiro Morimoto, both of Iwakuni, and Yoshioki Yoshioka, Waki, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Feb. 4, 1975, Ser. No. 547,028

Claims priority, application Japan, Feb. 5, 1974, 49-14149

Int. Cl.² C09D *11/00*

U.S. Cl. 106—32 **15 Claims**

1. A process for preparing resins for use in printing inks, which comprises

a. copolymerizing not less than 50% by weight of dicyclopentadiene and not more than 50% by weight of at least one other cationically polymerizable monomer having at least one double bond at a temperature ranging from −20 to 100° C. in the presence of a Friedel-Crafts polymerization catalyst resulting in a copolymer,

b. reacting 1 to 20% by weight, based on the weight of the resulting copolymer, of an α,β-unsaturated carboxylic acid or its anhydride with the resulting copolymer, and then

c. esterifying the resulting adduct to a degree of 20 to 100% with a polyhydric alcohol.

4,028,120
MOLD RELEASE AGENT FOR URETHANE FOAMED RUBBER

Robert Earl Emond, Mooretown, Canada, assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Dec. 20, 1974, Ser. No. 534,858

Int. Cl.² B28B *7/38*

U.S. Cl. 106—38.24 **6 Claims**

1. A mold release agent for applying to the surfaces of a mold, consisting essentially of from about 3 to about 25% by weight of the sodium soap of tall oil acids in admixture with from about 12 to about 38 wt. % kerosene, from about 3.5 to about 5 wt. % paraffin wax and a paraffin base oil.

4,028,121
LEAD FELDSPAR GLASS-CERAMIC BODIES

Kenneth Chyung, Elmira, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed July 18, 1975, Ser. No. 597,249

Int. Cl.² C03C *3/22*

U.S. Cl. 106—39.8 **9 Claims**

1. A glass-ceramic article exhibiting a coefficient of thermal expansion (25°–300° C.) of less than 35×10^{-7}/°C., a D.C. resistivity (log ρ) at 200° C. of at least 10 and at 500° C. of at least 7, a dielectric constant at 1 KC and 25° C. of at least 5, and a loss tangent at 100 KC and 25° C. of less than 0.001, and consisting essentially of substantially uniformly-sized crystals homogeneously dispersed within a glassy matrix, said crystals comprising at least 50% by volume of the article, subsantially all of said crystals having a grain size less than about 1 micron in diameter, and consisting predominantly of lead feldspar solid solution (basically $PbO.Al_2O_3.2SiO_2$), said article consisting essentially, by weight on the oxide basis, of about 26–45% PbO, 12–28% Al_2O_3, 30–50% SiO_2, and at least 3% but less than 6% TiO_2.

4,028,122
POROUS REFRACTORY SHAPES

Herbert Greenewald, Jr., 4296 Braunton Road, Columbus, Ohio 43220

Continuation-in-part of Ser. Nos. 370,624, June 18, 1973, abandoned, and Ser. No. 172,550, Aug. 17, 1971, abandoned. This application Aug. 5, 1975, Ser. No. 602,122

Int. Cl.² C04B *35/52*

U.S. Cl. 106—40 R **9 Claims**

1. A process of manufacturing a rigid porous refractory shape comprising the steps of: (a) mixing refractory particles selected from the group consisting essentially of alumina particles, zircon particles, silica particles, chromium oxide particles, and silicon carbide particles with bond-forming ingredients consisting of aluminum metal powder, water, and a corrosion accelerator in solution with said water to a fluid consistency; (b) casting said fluid mixture into a form at least in part defining said shape; and (c) reacting said bond-forming ingredients to form aluminum hydroxide bonds between said refractory particles, said aluminum metal powder ingredient weighing substantially from 5 to 20% the weight of said refractory particles, said water ingredient weighing substantially from 10 to 40% the weight of said refractory particles, and said corrosion accelerator being from the group consisting essentially of aluminum nitrate, aluminum chloride, nitric acid, hydrochloric acid, sulfuric acid, ammonium oxalate, oxalic acid, chromic acid, chromium nitrate, hydroxylacetic acid, gluconic acid, and citric acid and weighing substantially from 5 to 35% the weight of said refractory particles and substantially from 67 to 700% the weight of said aluminum metal powder.

4,028,123

COMPACTED REFRACTORY SHAPES

Herbert Greenewald, Jr., 4296 Braunton Road, Columbus, Ohio 43220

Continuation-in-part of Ser. Nos. 370,624, June 18, 1973, abandoned, and Ser. No. 172,550, Aug. 17, 1972, abandoned.
This application Aug. 5, 1975, Ser. No. 602,123
The portion of the term of this patent subsequent to Mar. 24, 1994, has been disclaimed.
Int. Cl.² C04B 35/52
U.S. Cl. 106—44 10 Claims

1. A process of manufacturing a rigid refractory shape comprising the steps of: (a) mixing refractory particles selected from the group consisting essentially of alumina particles, zircon particles, silica particles, chromium oxide particles, and silicon carbide particles with bond-forming ingredients consisting of aluminum metal powder, water, and a corrosion accelerator in solution with said water to form a uniform mixture; (b) compacting said mixture in a form at least in part defining said refractory shape; and (c) reacting said bond-forming ingredients to form aluminum hydroxide bonds between said refractory particles and thereby form said rigid refractory shape, said aluminum metal powder weighing substantially from 5 to 10% the weight of said refractory particles, said water weighing substantially from 2 to 15% the weight of said refractory particles, and said corrosion accelerator being from the group consisting essentially of aluminum nitrate, aluminum chloride, nitric acid, hydrochloric acid, sulfuric acid, ammonium oxalate, oxalic acid, chromic acid, chromium nitrate, magnesium oxide, calcium oxide, hydroxylacetic acid, gluconic acid, and citric acid and weighing substantially from 2 to 10% the weight of said refractory particles and substantially from 35 to as much as 200% the weight of said aluminum metal powder.

4,028,124

METHOD OF ENHANCING THE REFRACTORINESS OF HIGH PURITY FUSED SILICA

Peter P. Bihuniak, Corning, and Donald L. Guile, Horseheads, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Apr. 26, 1976, Ser. No. 680,451
Int. Cl.² C04B 35/14
U.S. Cl. 106—69 9 Claims

1. In an improved method of producing a high purity fused silica product, wherein a liquid form of silica sol or slurry is dried to form solid silica bodies which are then thermally vitrified, the improvement, whereby the refractoriness of the fused silica is enhanced, which comprises doping the silica containing liquid with 20 to 200 parts per million by weight, as based on the fused silica, of a metal oxide selected from the group consisting of chromium, molybdenum, zinc, and iron oxides in conjunction with up to 1500 parts per million by weight of elemental silicon.

4,028,125

CEMENT COMPOSITION

Robert C. Martin, Tulsa, Okla., assignor to The Dow Chemical Company, Midland, Mich.

Filed Mar. 25, 1976, Ser. No. 670,331
Int. Cl.² C04B 7/35
U.S. Cl. 106—89 27 Claims

1. A cement composition comprising portland cement and the calcium sulfate hemihydrate form of gypsum in a weight ratio of from 3:1 to 1:3 and, based on the total weight of said portland cement and gypsum:

a. from about 5 to about 25 percent alkali metal nitrate; and
b. from about 0.1 to about 2 percent of at least one retarder selected from the group consisting of
1. a low molecular weight polycarboxylic acid,
2. a sodium, potassium, or lithium salt of a low molecular weight polycarboxylic acid, and
3. an alakline hexametaphosphate.

4,028,126

PROCESS FOR MANUFACTURING RAPID HARDENING PORTLAND CEMENT CLINKER

Shigejiro Mori, Kawasaki; Hiroshi Uchikawa, Funabashi, and Shunichiro Uchida, Tokyo, all of Japan, assignors to Onoda Cement Company, Ltd., Yamaguchi, Japan

Continuation of Ser. No. 208,068, Dec. 15, 1971, abandoned.
This application Jan. 7, 1974, Ser. No. 431,157
Claims priority, application Japan, Dec. 28, 1970, 46-120519
Int. Cl.² C04B 7/54
U.S. Cl. 106—100 9 Claims

1. A process for manufacturing rapid hardening portland cement which comprises adding calcium sulfate hemihydrate and anhydrite to a clinker containing 10 – 70% by weight of $11CaO.7Al_2O_3.CaX_2$, wherein X is a halogen, 15 – 60% by weight of $3CaO.SiO_2$ and less than 1% by weight of free CaO which clinker is prepared by adding 0.5 – 4.5% by weight based on SO_3 of at least one sulfur compound selected from the group consisting of calcium sulfate, calcium sulfite and calcium sulfide to mixed raw materials which comprise an aluminous material, a calcareous material, a siliceous material, an iron source and a halogen source; and burning the obtained mixture at the temperature of 1265° – 1400° C in an oxidizing atmosphere, wherein said calcium sulfate hemihydrate and anhydrite are added in an amount such that the weight ratio of Al_2O_3/SO_3 in the cement is present in a range of 0.7 – 1.8.

4,028,127

PLASTER OF PARIS USING GLYOXAL TREATED HYDROXYALKYL GUAR

Fred John Maske, St. Paul, and Robert Nordgren, Minneapolis, both of Minn., assignors to General Mills Chemicals, Inc., Minneapolis, Minn.

Filed Mar. 10, 1976, Ser. No. 665,360
Int. Cl.² C04B 11/14
U.S. Cl. 106—111 3 Claims

1. A blend consisting essentially of as the first component a reaction product of hydroxyalkyl ether of guar and glyoxal, wherein the hydroxyalkyl group of the hydroxyalkyl ether of guar contains from 2 to 4 carbon atoms, and the amount of glyoxal reacted with the hydroxyalkyl ether of guar is about 0.01 to 1.5% by weight of the hydroxyalkyl ether of guar, said reaction being conducted at a pH of about 6.0 to 6.3 in a water-solvent media; said reaction product being in an amount of about 0.2 to 3.0% by weight of the total blend; and, as the second component a non-guar cross-linking gypsum cement.

4,028,128

PIGMENT DISPERSIONS

George Heddle Robertson, Paisley, Scotland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 9, 1976, Ser. No. 665,192
Claims priority, application United Kingdom, Mar. 12, 1975, 10239/75
Int. Cl.² C09C 3/08
U.S. Cl. 106—308 Q 11 Claims

1. A composition comprising

i. a pigment
ii. a carboxy ester having an acid value in the range of from 15 to 140 mg KOH/g and having been formed by the reaction of:
a. a compound of formula ROH, or a mixture of such compounds, wherein R is an alkyl or alkenyl residue, each having from 12 to 30 carbon atoms, or a hydroxy-terminated carboxylic acid ester having from 12 to 100 carbon atoms, with
b. trimellitic acid or a derivative thereof and optionally
c. a diol of the formula HO-Y-OH wherein Y is a straight-

or branched-alkylene residue having from 2 to 12 carbon atoms, optionally containing in addition, an alkyl or alkylene side chain of 2 to 22 carbon atoms, attached by an ether or ester linkage, or Y is a hydrocarbon residue having from 4 to 12 carbon atoms containing ether or thioether linkages, and optionally

iii. an organic liquid, wherein said carboxy ester is present in an amount of from 2 to 200% by weight based on the weight of pigment and the solvent is present in the range of from 10% to 90% by weight based on the total weight of the dispersion.

4,028,129

HEAT-DEVELOPABLE PHOTOSENSITIVE MATEKIALS

Nobuo Suzuki; Yasuhiro Noguchi, and Takao Masuda, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jan. 8, 1975, Ser. No. 539,566
Claims priority, application Japan, Jan. 8, 1974, 49-5453
Int. Cl.² G03C *1/02, 1/76*
U.S. Cl. 96—114.1 15 Claims

1. A heat-developable photosensitive material comprising a support having thereon one or more layers with at least one of the layers containing at least one of (a) an organic silver salt, (b) a catalytic amount of a photosensitive silver halide or a component capable of forming a photosensitive silver halide and (c) a reducing agent, and (d) at least one of an inorganic peroxide and a peroxodisulfate wherein the amount of said inorganic peroxide is about 0.001 to 50 moles per mole of said organic silver salt of component (a) and wherein the amount of said peroxodisulfate is about 10^{-6} to 10^{-2} moles per mole of said organic silver salt of component (a).

4,028,130

DISPOSAL METHOD AND USE OF SEWAGE SLUDGE

William C. Webster; Robert G. Hilton, and Ronald F. Cotts, all of Norristown, Pa., assignors to IU Conversion Systems, Inc., Philadelphia, Pa.

Continuation-in-part of Ser. Nos. 494,338, Aug. 2, 1974, abandoned, and Ser. No. 420,364, Nov. 30, 1973, abandoned. This application Nov. 15, 1974, Ser. No. 524,148
Int. Cl.² C04B *1/00*
U.S. Cl. 106—120 32 Claims

1. A water-solids mixture hardenable under atmospheric conditions the dry solids of which comprise (based on weight % of dry solids):

1–15% lime

1–50% digested sewage sludge solids

20–90% fly ash, and the water of which provides a moisture content (based also on weight % dry solids) of 5- 50%.

7. Method of treating a sludge from a municipal sewage plant comprising admixing said sludge with lime and fly ash such that the final composition of said admixture has a moisture content of 5–50% and the dry solids therein comprise:

1–15% lime

1–50% digested sewage sludge solids

20–90% fly ash, and

permitting said admixture to harden under atmospheric conditions.

4,028,131

RAW MATERIALS FOR GLASS MAKING AND METHOD OF MAKING THEM

André Pons, Villejuif, France, assignor to Saint-Gobain Industries, Neuilly sur Seine, France

Continuation of Ser. No. 258,423, May 31, 1972, abandoned, which is a continuation-in-part of Ser. No. 792,261, Jan. 21, 1969, abandoned. This application May 31, 1974, Ser. No. 475,201
Claims priority, application France, Jan. 23, 1968, 68.137060
Int. Cl.² C03C *3/04*
U.S. Cl. 106—52 5 Claims

1. The method of preparing a vitrifiable charge for the manufacture of silicon-sodium-calcium glass which comprises mixing at room temperature into a homogeneous mass sand, quicklime, and calcined dolomite, incorporating in the mixture an alkali metal supplying material including alkali metal hydroxide, from 15 to 100% by weight of the alkali metal being supplied by said alkali metal hydroxide, and a quantity of water sufficient to permit granulation of the mixture.

4,028,132

CELLULOSE SOLUTIONS AND PRODUCTS PREPARED THEREFROM

Morton H. Litt, University Heights, Ohio, and Narayan Ganesh Kumar, Webster, N.Y., assignors to International Playtex, Inc., New York, N.Y.

Filed Nov. 25, 1975, Ser. No. 635,017
Int. Cl.² C08L *1/02*
U.S. Cl. 106—163 R 18 Claims

1. A solution of cellulose in hydrazine where in the solvent medium comprises at least 30% by weight hydrazine.

4,028,133

REDUCED CHARGE MONTMORILLONITE PIGMENT FOR SENSITIZING RECORD MATERIAL

Peter A. H. Isaac, Suramit, and T. Dixon Oulton, Watchung, both of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Menlo Park, N.J.

Continuation-in-part of Ser. No. 648,163, Jan. 12, 1976. This application Apr. 5, 1976, Ser. No. 673,596
The portion of the term of this patent subsequent to Nov. 23, 1993, has been disclaimed.
Int. Cl.² C09C *1/42*
U.S. Cl. 106—288 B 14 Claims

1. A sensitizing pigment for record material comprising micron-size particles of a mixed layer smectite, the lattice of which is partially dioctahedral montmorillonite and partially trioctahedral such as saponite or hectorite, and wherein the proportion of trioctahedral is small, said mixed layer smectite having been subjected to ion-exchange treatment with a preselected quantity of lithium ions followed by heat treamtnet to collapse irreversibly the dioctahedral montmorillonite structure, said particles being capable when coated on paper of producing a stable intense blue image when printed with a solution of crystal violet lactone in an organic solvent.

4,028,134

REINFORCED RESIN FILLER COMPOSITIONS

Vance A. Stayner, and Barry L. Sloss, both of P.O. Box 63, Sugar Grove, Ill. 60554

Division of Ser. No. 401,208, Oct. 24, 1973, Pat. No. 3,920,603. This application Aug. 25, 1975, Ser. No. 607,138
Int. Cl.² C08K *7/00*
U.S. Cl. 106—291 5 Claims

1. For use as a reinforcing filler in a curable, synthetic polyester resin, a dry blend of about 1 to 30 parts by weight of microscopically sized glass spheres, about 10 to 60 parts by weight of Suzorite mica platelets, and about 20 to 70 parts by weight of aluminum trihydrate particles.

4,028,135

METHOD OF CLEANING SURFACES BY IRRADIATION WITH ULTRAVIOLET LIGHT

John R. Vig, Colts Neck, and John W. LeBus, Farmingdale, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 22, 1976, Ser. No. 671,798

Int. Cl.² B08B *3/10*

U.S. Cl. 134—1 12 Claims

1. Method of removing contaminants from surfaces including the steps of:

A. precleaning the surfaces with solvents; then rinsing in running ultrapure water; and finally, spinning dry immediately after the running water rinse; said precleaning also being carried out under an atmosphere of air;

B. placing the precleaned surfaces within about 5 millimeters of a lamp which emits short wavelength ultraviolet light that generates ozone in an oxygen containing atmosphere and that contains at least one wavelength between about 2000 angstroms and about 3000 angstroms; and irradiating the placed surfaces in an oxygen containing atmosphere with said short wavelength ultraviolet light from said lamp for about one minute.

4,028,136

METHOD AND DEVICE FOR CLEANSING SPINNING TURBINES OF A SPINNING MACHINE

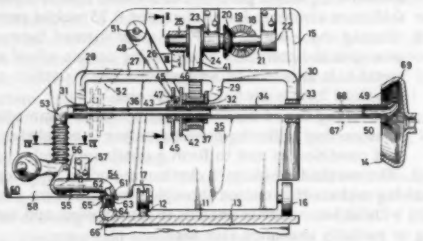
Heinz Kamp, Rickelrath, Germany, assignor to W. Schlafhorst & Co., Monchengladbach, Germany

Filed Dec. 3, 1975, Ser. No. 637,461

Claims priority, application Germany, Dec. 3, 1974, 2457034

Int. Cl.² B08B *1/04, 5/02*

U.S. Cl. 134—8 6 Claims



1. Method of cleansing rotatable spinning turbines located at respective spinning stations of a spinning machine which comprises driving a cleansing device having a telescoping tube assembly provided with a rotary cleansing brush at one end thereof from spinning turbine to spinning turbine of the spinning machine, inserting the one end of the telescoping tube assembly with the rotary cleansing brush provided thereat into the respective rotatable spinning turbine, connecting the other end of the telescoping tube assembly to a source of compressed air and rotating the rotary brush independently of the rotatable spinning turbine so as to cleanse the inner surface of the rotatable spinning turbine therewith and with the compressed air.

4,028,137

PROCESS FOR THE QUANTITATIVE REMOVAL OF RESIDUAL MELTS FROM CRUCIBLES

Adalbert Ellbrunner, Seibersdorf, Germany; Georg Priewasser, Ach, Duttendorf, Austria; Friedrich Georg, Braunau, Austria, and Horst Stock, Burghausen, Germany, assignors to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH, Burghausen, Germany

Filed Nov. 10, 1975, Ser. No. 630,572

Claims priority, application Germany, Nov. 14, 1974, 2454092

Int. Cl.² B01D *9/00;* B08B *1/00, 9/08*

U.S. Cl. 134—8 6 Claims

1. A process for quantitatively removing a residual high temperature crystal producing melt from the interior of a crucible containing the same comprising lowering into and immersing in the melt an inert movable solid capillary body having a melting point significantly higher than the temperature of said melt and which is insoluble in the melt, for a sufficient period of time to permit the melt to be absorbed by and to rise upward into the capillary body by way of capillary action, and vertically removing the capillary body and absorbed melt therein from the interior of the crucible.

4,028,138

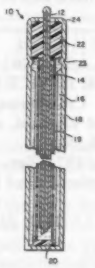
METHOD OF CONSTRUCTION OF AN ULTRAMINIATURE HIGH ENERGY DENSITY CELL

Arabinda N. Dey, Needham, Mass., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind.

Continuation-in-part of Ser. No. 314,316, Dec. 12, 1972, Pat. No. 3,945,846. This application Mar. 8, 1976, Ser. No. 664,780

Int. Cl.² H01M *6/00*

U.S. Cl. 29—623.2 13 Claims

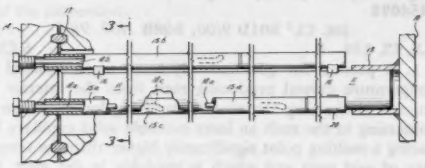


1. A method for constructing an ultraminiature electrical cell comprising the steps of adhering a first solid active electrode material as a layer on the lower end of a hollow metal needle; adhering a second solid active electrode material as a layer on the inner surface of an elongated cylindrical metallic container, said container having a volume of less than about 0.01 cubic inch and being open at one end thereof with the inner surface of said second electrode material layer forming a cavity having a diameter greater than that of said needle with said layer of first solid active electrode material thereon; securing means for sealing the open end of said container on the upper end of said needle; thereafter axially placing a separator and said needle, lower end first, within said cavity with said sealing means in position to seal said container; introducing an organic electrolyte solution through said needle; and closing the end of said needle above said sealing material.

4,028,139
METHODS AND MULTIPLE THERMOCOUPLE SUPPORT ASSEMBLY

Randlow Smith; Henry B. Jones; Adrianus C. Jobsis, and Hugh C. Deloney, all of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 4, 1975, Ser. No. 637,787
Int. Cl.² H01L 35/02
U.S. Cl. 136—230 17 Claims



6. A multiple thermocouple assembly for a vessel used in processing a fluid over a fixed bed of particulate solids for measuring various fluid temperatures simultaneously in different, defined locations in a horizontal section through the fixed bed in the vessel comprising,

a. an elongated tube support fastened horizontally in the vessel extending from one side wall to the opposite side wall in a predetermined horizontal section across the vessel,

b. a plurality of thermowells fixedly secured with a fastening means to said elongated tube support along the length of the tube support and substantially equally spaced around the periphery of the tube support to provide a high structural strength multiple thermocouple assembly as a beam,

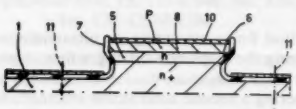
c. a bevelled plug fixed in each thermowell at different predetermined locations across the tube support, and

d. a thermocouple mounted in each of the thermowells wedged against the bevelled plug in its respective thermowell at said predetermined locations in said horizontal section across the vessel for simultaneously measuring the fluid temperatures at the different various predetermined locations across the fixed bed in the vessel.

4,028,140
SEMICONDUCTOR DEVICE MANUFACTURE

John Gilbert Summers, Crowborough, and Maurice Pierrepont, Horley, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 22, 1975, Ser. No. 624,726
Claims priority, application United Kingdom, Oct. 29, 1974, 46726/74
Int. Cl.² H01L 21/265
U.S. Cl. 148—1.5 9 Claims



1. A method of manufacturing a semiconductor device comprising the steps of

a. providing a semiconductor layer of one conductivity type on a semiconductor body portion of the same conductivity type but higher conductivity,

b. forming an etch-masking layer on part of the semiconductor layer surface,

c. subjecting the semiconductor layer surface to an etching treatment which etches through the semiconductor layer where exposed around said etch-masking layer to leave a mesa portion of the semiconductor layer under said etch-masking layer and to expose the part of said semiconductor body portion around said mesa portion, and

d. while using the etch-masking layer to mask the top of said mesa-portion, subjecting the exposed parts of said semiconductor body portion and said mesa portion to further etching which includes removing the material of said semiconductor body portion faster than that of said semiconductor layer to etch under said mesa portion of the semiconductor layer and cause the whole upper edge of said mesa portion to overhang the adjacent etched surface, the side of said mesa portion being bevelled by the further etching so that the area of the resulting mesa portion of the semiconductor layer increases from its interface with said semiconductor body portion.

4,028,141
ALUMINUM IRON SILICON ALLOY

E. Henry Chia; Frank M. Powers, and Kenneth E. Chadwick, all of Carrollton, Ga., assignors to Southwire Company, Carrollton, Ga.

Filed Mar. 12, 1975, Ser. No. 558,045
Int. Cl.² C22F 1/04
U.S. Cl. 148—2 8 Claims

1. A method of preparing a heat resistant aluminum alloy electrical conductor having a minimum electrical conductivity of sixty-one percent (61%) IACS and having evenly dispersed therein iron-aluminum-silicon intermetallic particles having a particle diameter of less than one micron when measured along the transverse axis of said particles, comprising the steps of:

a. Alloying from about 0.25 to about 0.85 weight percent silicon, from about 0.30 to about 0.95 weight percent iron with the balance of aluminum containing trace elements selected from the group consisting of copper, manganese, magnesium, titanium, vanadium and zinc wherein the individual concentrations of said trace elements do not exceed 0.05 weight percent and the total concentration of said trace elements does not exceed 0.15 weight percent;

b. Casting the alloy in a moving mold formed between a groove in the periphery of a rotating casting wheel and a metal belt adjacent to said groove for a portion of its length to form a continuous bar; and

c. Hot-rolling the continuous bar substantially immediately after casting while the continuous bar is in substantially that condition as cast to form a continuous rod.

2. The method of claim 1 further including the steps of drawing said continuous rod through a series of wire-drawing dies without intermediate anneals to form a wire; and annealing or partially annealing said wire.

5. A heat resistant aluminum alloy electrical conductor made by the method of claim 2 having a minimum electrical conductivity of sixty-one percent (61%) IACS and having evenly dispersed therein iron-aluminum-silicon intermetallic particles having a particle diameter of less than one micron when measured along the transverse axis of said particles consisting essentially of from about 0.25 to about 0.85 weight percent silicon, from about 0.30 to about 0.95 weight percent iron with the balance of aluminum containing trace elements selected from the group consisting of copper, manganese, magnesium, titanium, vanadium and zinc wherein the individual concentrations of said trace elements do not exceed 0.05 weight percent and the total concentration of said trace elements does not exceed 0.15 weight percent.

4,028,142

CARBO-NITRIDING PROCESS USING NITRILES

Diethelm Bitzer, Putzbrunn near Munich, Germany, and Dieter Lohmann, Pratteln, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 5, 1975, Ser. No. 547,284
Claims priority, application Switzerland, Feb. 7, 1974, 1705/74
Int. Cl.² C21D *1/48*
U.S. Cl. 148—16.5 9 Claims

1. A process for producing on a metallic or metalloid substrate, which consists at least partially of one or more of the elements selected from the group consisting of iron, boron, silicon and the transition metals of sub-groups 4 to 6 of the periodic table, a diffusion layer of material selected from the group consisting of said metal carbide, nitride, and carbonitride which comprises

heating said substrate to a temperature of 500° C to 1800° C, and

contacting said substrate with a gaseous or vaporous reactant stream comprising a carrier gas selected from argon and hydrogen and at least one carbon- and nitrogen-releasing compound which readily decomposes at substrate temperature, said compound selected from the group consisting of acetonitrile, adipodinitrile, 3-chloropropionitrile, tetracyanoethylene, acrylonitrile, tolunitrile, butyronitrile, succinodinitrile, 3-dimethylaminopropionitrile and cyclohexanecarboxylic acid nitrile, permitting reaction thereof to form said diffusion layer on said substrate.

4,028,143

WAX-FLUX COMPOSITION CONTAINING A SUCCINIMIDE SALT OF AN ALKYLARYL SULFONIC ACID FOR SOLDERING

Robert A. Stayner, Lafayette, and Warren Lowe, El Cerrito, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 537,147, Dec. 30, 1974, Pat. No. 3,954,494. This application Nov. 3, 1975, Ser. No. 627,992
Int. Cl.² C23K *35/34*
U.S. Cl. 148—23 6 Claims

1. A process for soldering an electrical component to a printed circuit board, said board comprising a non-conducting substrate and a pattern of an electrically conductive metal laminated to said substrate, said metal being solderable with a low-melting-point alloy solder, said board having component lead receiving holes through both said substrate and said metal pattern, said component having electrical leads, and said component being mounted on said board by having at least one of said leads inserted through a said lead receiving hole, said process comprising:

a. applying a molten wax-flux composition to the metal pattern side of said board and to said component lead;

b. allowing said wax-flux composition to solidify;

c. trimming said component lead; and

d. soldering said component to said printed circuit board with a low-melting-point alloy solder, wherein said wax-flux composition comprises:

I. a major amount of a wax having an AMP between 0° C and 100° C; and

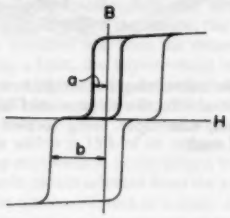
II. an amount effective to cause fluxing, at or below the soldering temperature, of the piece to be soldered in said process of a wax-soluble product obtained by first reacting a C_{20}–C_{400} aliphatic hydrocarbon-substituted succinic acid or a derivative thereof which is capable of forming carboximide bonds with a C_2–C_{30}, N_2–N_{10} alkylene polyamine to form a carboximide and then reacting said carboximide with a (C_6–C_{30} alkyl)aryl sulfonic acid.

4,028,144

SEMI-HARD MAGNETIC ALLOY WITH COMPOSITE MAGNETIC PROPERTY AND METHOD OF MAKING THE SAME

Hiroshi Tomishima; Toshio Takahashi; Kenichi Ono, and Kazuhiro Kumasaka, all of Mito, Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Aug. 14, 1975, Ser. No. 604,790
Claims priority, application Japan, Aug. 22, 1974, 49-96379
Int. Cl.² C04B *35/00*
U.S. Cl. 148—31.55 8 Claims



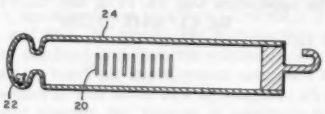
1. A cold-worked and annealed semi-hard magnetic alloy consisting essentially of, by weight, 15–50% Co, 5–25% Ni, 1–9% Cr, 0.5–10% Cu, balance Fe and incidental impurities, and further characterized by exhibiting composite hysteresis characteristics as shown in FIG. 3.

4,028,145

STOICHIOMETRIC ANNEALING OF MERCURY CADMIUM TELLURIDE

Anthony F. Kasenga, Lyme, N.H., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 29, 1975, Ser. No. 626,811
Int. Cl.² C22F *1/02*
U.S. Cl. 148—20.3 6 Claims



1. A process for controlling stoichiometry and free-carrier concentration of a mercury cadmium telluride alloy, the process comprising:

providing a body of the alloy and a cadmium vapor source other than the body in a closed environment; and

heat treating the body in the presence of the excess cadmium vapor and maintaining the body at a temperature for a time of sufficient duration to adjust stoichiometry and free-carrier concentration.

4,028,146

LPE TECHNIQUE FOR FABRICATING TAPERED OPTICAL COUPLERS

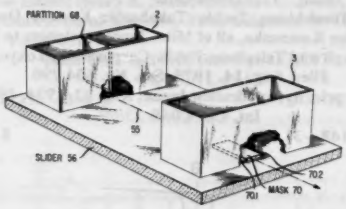
Ralph Andre Logan; James Logan Merz, both of Morristown; Franz Karl Reinhart, Summit, and Harry Gregory White, Bernardsville, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 557,250, March 11, 1975, Pat. No. 3,978,426. This application May 20, 1976, Ser. No. 688,122
Int. Cl.² H01L *21/208*
U.S. Cl. 148—171 11 Claims

1. A liquid phase epitaxy method of fabricating on a substrate a layer having a taper adjacent a zone of uniform thickness comprising the steps of:

positioning a mask in closely spaced relation over a portion of said substrate,

bringing a saturated source solution into contact with said



substrate while maintaining a controlled cooling program for a time period effective to grow said layer to the desired thickness, said taper being formed adjacent the edges of said mask.

4,028,147

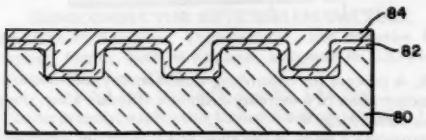
LIQUID PHASE EPITAXIAL PROCESS FOR GROWING SEMI-INSULATING GAAS LAYERS

G. Sanjiv Kamath, Malibu, and Bradley W. Smith, Oxnard, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Division of Ser. No. 530,336, Dec. 6, 1974, Pat. No. 3,994,755. This application Aug. 16, 1976, Ser. No. 714,726

Int. Cl.² H01L *21/208*

U.S. Cl. 148—171 **3 Claims**



1. A process for forming a monolithic gallium arsenide structure having a plurality of electrically insulated gallium arsenide regions therein comprising the steps of:

a. providing a gallium arsenide substrate,

b. removing preselected portions of said gallium arsenide substrate in order to form ridges and valleys adjacent one surface thereof,

c. forming a thin layer of semi-insulating gallium arsenide on said one surface of said substrate and covering said ridges and valleys thereof,

d. forming an epitaxial layer of gallium arsenide on the surface of said semi-insulating layer; and

e. removing excess portions of said epitaxial layer extending beyond said semi-insulating layer to thereby expose portions of said semi-insulating layer and leave a plurality of electrically isolated gallium arsenide islands in the valleys of said substrate, whereby said islands may be utilized in the fabrication of gallium arsenide light emitting devices, as well as gallium arsenide monolithic circuitry for driving said gallium arsenide light emitting devices.

4,028,148

METHOD OF EPITAXIALLY GROWING A LAMINATE SEMICONDUCTOR LAYER IN LIQUID PHASE

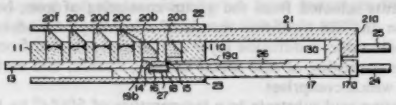
Yoshiji Horikoshi, Tokyo, Japan, assignor to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Division of Ser. No. 639,713, Dec. 11, 1975, Pat. No. 4,013,040. This application Aug. 19, 1976, Ser. No. 715,844

Claims priority, application Japan, Dec. 20, 1974, 49-145599

Int. Cl.² H01L *21/208*

U.S. Cl. 148—171 **4 Claims**



1. A method of epitaxially growing a laminate semiconductor layer in liquid phase on the surface of a crystalline substrate by bringing different kinds of liquid phase epitaxial growth solutions into contact with said surface, which characteristically comprises the steps of expelling the unnecessary portion of each preceding one of the respective epitaxial growth solutions deposited on the surface of the crystalline substrate by each succeeding one from said surface for interchange between the adjacent epitaxial growth solutions, and repeating said operation for the epitaxial growth of a laminate semiconductor layer.

4,028,149

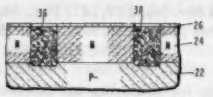
PROCESS FOR FORMING MONOCRYSTALLINE SILICON CARBIDE ON SILICON SUBSTRATES

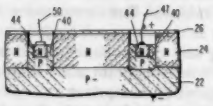
John L. Deines, Pleasant Valley; San-Mei Ku, Poughkeepsie; Michael R. Poponiak, Newburgh, and Paul J. Tsang, Poughkeepsie, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed June 30, 1976, Ser. No. 701,452

Int. Cl.² H01L *21/76, 21/20, 27/04*

U.S. Cl. 148—175 **12 Claims**





1. A method for forming a monocrystalline silicon carbide on a monocrystalline silicon substrate comprising

converting a portion of a monocrystalline silicon substrate into a porous silicon substance by an anodic treatment carried out in an aqueous solution of hydrofluoric acid,

heating the resultant substrate to a temperature in the range of 1050° C to 1250° C in an atmosphere that includes a hydrocarbon gas selected from the group consisting of methane, ethane, ethylene, propane, propylene and mix-

tures thereof for a time sufficient to react the porous silicon and the gas thereby forming a lower layer of monocrystalline silicon carbide and an overlying layer of polycrystalline silicon carbide.

4,028,150

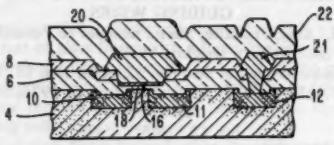
METHOD FOR MAKING RELIABLE MOSFET DEVICE

Robert Henry Collins, Wappingers Falls; Richard F. Levine; William D. North, both of Poughkeepsie; Gerald D. O'Rourke, Poughkeepsie, and Gerald R. Parker, Wappingers Falls, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Division of Ser. No. 357,046, May 3, 1973, abandoned. This application Feb. 9, 1976, Ser. No. 656,222

Int. Cl.² H01L *21/22*

U.S. Cl. 148—187 **4 Claims**



1. A method for fabricating a field effect transistor, in which the active regions of the transistor are protected against contamination, comprising the steps of:

forming a silicon dioxide coating on a surface of a silicon semiconductor substrate;

removing portions of said coating to expose spaced adjacent regions in the substrate;

depositing phosphorus pentoxide on the oxide coating and on said exposed regions;

heating the substrate in an oxygen atmosphere to cause phosphorus to diffuse into said exposed adjacent regions, thereby forming source and drain regions of a field effect transisitor, and also a relatively thick composite insulator layer, over said exposed source and drain regions, of silicon dioxide and phosphosilicate glass;

exposing a channel region between said source and drain regions;

forming a thin coating of silicon dioxide over said exposed channel region;

forming a thin layer of phosphosilicate glass on said thin oxide; and

depositing a gate electrode over said thin layer of phosphosilicate glass and over a portion of said thick composite insulator layer.

4,028,151

METHOD OF IMPREGNATING A SEMICONDUCTOR WITH A DIFFUSANT AND ARTICLE SO FORMED

Joseph Lindmayer, Bethesda, Md., assignor to Solarex Corporation, Rockville, Md.

Filed Jan. 19, 1976, Ser. No. 650,139

Int. Cl.² H01L *21/223*

U.S. Cl. 148—189 **10 Claims**

1. A method of forming a junction at a surface of a silicon wafer, comprising heating said surface with a diffusant in the presence of an inert gas selected from the group consisting of helium and neon in an amount sufficient to enhance the electrical performance of the junction resulting from penetration of said wafer surface by said diffusant compared to a junction formed by diffusion in an atmosphere of argon or nitrogen.

4,028,152

EXPLOSIVE COMPOSITION CONTAINING HIGH DENSITY HYDROCARBON LIQUID

Walter L. Borkowski, Media, and Abraham Schneider, Overbrook Hills, both of Pa., assignors to Suntech, Inc., St. Davids, Pa.

Filed Mar. 29, 1976, Ser. No. 671,634

Int. Cl.² C06B *31/28*

U.S. Cl. 149—46 **15 Claims**

1. An improved method of blasting wherein a hole is drilled and then filled with both an inorganic nitrate or mixture thereof and a liquid hydrocarbon and then a detonator is placed in the hole, and then the nitrate, the hydrocarbon and detonator are confined and then the detonator is activated thereby causing a blast; the improvement comprises that the hydrocarbon is a high density hydrocarbon liquid having a density ≥ 0.910 and a net heating value $\geq$ 135,000 BTU/-gallon and a pour point $\leq -30°$ F and wherein the amount of hydrocarbon is within $\pm$ 15% of an oxygen balance.

9. A blasting composition comprising a mixture of both

A. an inorganic nitrate selected from the group consisting of ammonium nitrate, mixture of a major amount of ammonium nitrate and a minor amount of sodium nitrate, potassium nitrate, calcium nitrate, magnesium nitrate and a mixture of the minor nitrates; and

B. a high density hydrocarbon having a density 0.910, and a net heating value 135,000 BTU/gallon and wherein the amount of the hydrocarbon is within $\pm$ 15% of an oxygen balance.

4,028,153

EXPLOSIVE COMPOSITION CONTAINING ALKYL ETHERS HAVING HIGH DENSITIES

Abraham Schneider, Overbrook Hills, Pa., assignor to Suntech, Inc., St. Davids, Pa.

Filed Mar. 29, 1976, Ser. No. 671,635

Int. Cl.² C06B *31/28*

U.S. Cl. 149—46 **5 Claims**

1. An improved method of blasting wherein a hole is drilled and then filled with both an inorganic nitrate or mixture thereof and a liquid sensitizer and then a detonator is placed in the hole, and then the nitrate, the hydrocarbon and the detonator are confined and then the detonator is activated thereby causing a blast; the improvement comprises that the sensitizer contains at least about 30% by weight of alkyl ether of Binor-S and wherein the amount of sensitizer is within $\pm$15% of an oxygen balance.

4,028,154

AMMONIUM 2,4,5-TRINITROIMIDAZOLE

Michael D. Coburn, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 1, 1976, Ser. No. 719,636

Int. Cl.² C06B *25/34*

U.S. Cl. 149—92 **1 Claim**

1. As a chemical explosive, the composition of matter ammonium 2,4,5-trinitroimidazole.

4,028,155

PROCESS AND MATERIAL FOR MANUFACTURING THIN FILM INTEGRATED CIRCUITS

Adir Jacob, Framingham, Mass., assignor to LFE Corporation, Waltham, Mass.

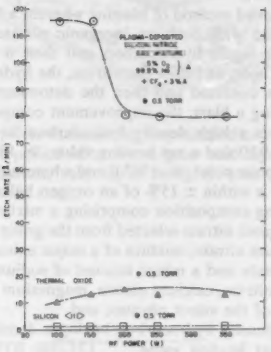
Continuation-in-part of Ser. No. 446,667, Feb. 28, 1974, abandoned. This application Aug. 10, 1976, Ser. No. 713,128

Int. Cl.² B29C *17/08*

U.S. Cl. 156—643 **54 Claims**

1. A process for use in the manufacture of multi-layer thin film integrated circuits for selective removal of specific layers, comprising the step of:

exposing the multi-layer thin film integrated circuit to a low temperature, low pressure plasma formed from a gaseous multi-component mixture of oxygen, a noble gas carrier and a halogen containing gas selected from the group consisting of:



organohalides defined as having no more than two carbon atoms per molecule and being at least partially substituted by halogens including a pedominance of fluorine atoms, inorganic halides defined as having at least one fluorine atom per molecule, and fluorine gas.

4,028,156

PLASTIC CONTAINER AND CLOSURE COLLAR COMBINATION AND METHOD

James L. Clark, Whitefish Bay, and Byron L. Mather, Milwaukee, both of Wis., assignors to Plastronics, Inc., Milwaukee, Wis.

Division of Ser. No. 499,008, Aug. 19, 1974, abandoned. This application Jan. 2, 1976, Ser. No. 646,124

Int. Cl.² B29C *27/04*

U.S. Cl. 156—69 **1 Claim**

1. The method of attaching a closure collar member having a circular groove formed therein to the tubular neck portion of a plastic container comprising the steps of:

a. inserting the tubular neck portion of the plastic container into and partially through a tubular mandril member so that the end portion of the neck will extend out the end of the mandril;

b. folding the end portion of the neck over the edge of the mandril member;

c. positioning the collar member on the mandril so that the folded end portion of the neck is inserted fully into the circular groove formed in the collar member; and

d. fusing the folded edge of the neck to the collar member at the root of the circular groove by passing radio frequency energy through the collar member and bag in the area to be fused to thereby seal the collar to the plastic container, said fusing step being performed by positioning a cylindrical welding electrode in contact with the collar and in alignment with the groove formed therein and then passing the radio frequency energy through the parts.

4,028,157

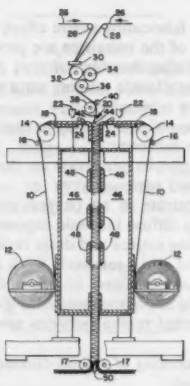
METHOD AND APPARATUS FOR MOVING AND GUIDING WIRES

Martin L. Abel, Franklin, Mich., assignor to Permalock Company, Inc., Auburn Heights, Mich.

Continuation-in-part of Ser. No. 323,440, Jan. 15, 1973, Pat. No. 3,915,789. This application June 6, 1975, Ser. No. 584,521

Int. Cl.² D05C *15/00*

U.S. Cl. 156—72 **28 Claims**



1. Method for folding a plurality of strands of flexible material to make non-woven bonded carpeting, comprising the steps of:

1. simultaneously moving the portions of a pair of elongated bondable members on both sides of the strands of flexible material along first predetermined paths,

2translating the movement of said elongated bendable members first predetermined paths to second predetermined paths in the portion of said members that engage the plurality of strands and fold them back and forth to form a series of loops therein,

3. advancing the series of loops and the plurality of strands,

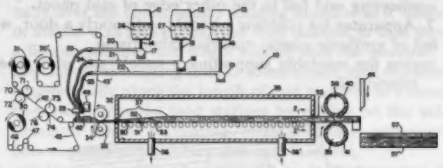
4. bonding the ends of the loops in a fixed position relative to each other.

8. Apparatus for moving a pair of elongated bendable members, to engage and fold a length of flexible material into a series of loops, comprising moving means for moving both elongated members simultaneously on each side of the flexible material along first predetermined paths, translating means for translating the movement of the portion of each elongated member that engages the flexible material from its predetermined path to a second predetermined path so that the elongated members will alternately engage the flexible material and urge it back and forth to form the series of loops.

4,028,158
STRUCTURAL LAMINATE AND METHOD FOR MAKING SAME

Donald E. Hipchen, Seminole; Michael J. Skowronski, and Joseph R. Hagan, both of Clearwater, all of Fla., assignors to The Celotex Corporation, Tampa, Fla.

Filed Jan. 19, 1976, Ser. No. 650,243
Int. Cl.² B32B 5/20
U.S. Cl. 156—79 26 Claims



1. A process for producing a structural laminate comprising the steps of:

I. contacting a thin, substantially incompressible yet expansible mat of glass fibers with a foam-forming mixture,

II. positioning a facing sheet on each face of the mat, and

III. passing the facing sheets having the mat and the foam-forming mixture therebetween through the nip of two rotating rolls,

the mat of glass fibers being further characterized by

A. the glass fibers being arranged in layers,

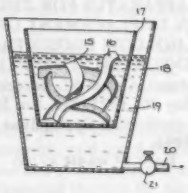
B. the glass fibers within each layer being long, straight and substantially parallel, and

C. the glass fibers in each layer being at an acute angle to the glass fibers in each next adjacent layer.

4,028,159
RESIN RECLAMATION IN CARPET MANUFACTURE

Alan H. Norris, Rome, Ga., assignor to Champion International Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 480,693, June 19, 1974, abandoned. This application Apr. 7, 1976, Ser. No. 674,413
Int. Cl.² B32B 35/00
U.S. Cl. 156—94 7 Claims



1. In the process for producing carpeting, the steps of removing and collecting selvedge during production of carpet material comprising:

a. a yarn supporting back of thermoplastic resin;

b. an adhesive comprising a mixture of:

1. an amorphous low molecular weight polyethylene resin;

2. a high molecular weight ethylene vinyl acetate copolymer resin which is an adhesive modifier for said amorphous resin; and

3. a filler; and

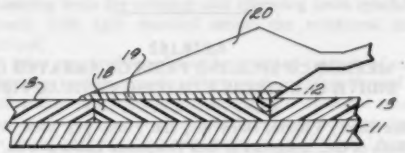
c. pile yarns formed from high molecular weight synthetic resin fibers selected from the group consisting of nylon, polypropylene and polyester fibers;

heating said selvedge in air to a temperature above the melting points of said resins to melt and degrade said resins sufficiently to produce adhesive modification characteristics substantially equivalent of said copolymer resin, separating melted resin from solid residue, if any, to reclaim meltable resin from said selvedge and utlizing said reclaimed resin as a substitute for ethylene vinyl acetate copolymer resin in an adhesive mixture in subsequent carpet production.

4,028,160
PRECURED STRIP METHOD FOR REPAIRING FLEXIBLE MATERIALS

Harvey J. Golumbic, Fullerton, Calif., assignor to Vinyl-Chem International, Inc., Glendale, Calif.

Filed Sept. 17, 1975, Ser. No. 614,129
Int. Cl.² B32B 35/00
U.S. Cl. 156—98 12 Claims



1. A process for repairing a damaged area in a vinyl base material comprising:

a. preparing an area to be repaired in the vinyl base material by making a hole with a sharp, clean edge;

b. cleaning the surface of the base material adjacent to the hole with a liquid cleaner;

c. drying the cleaned area by removing the liquid cleaner from the cleaned area;

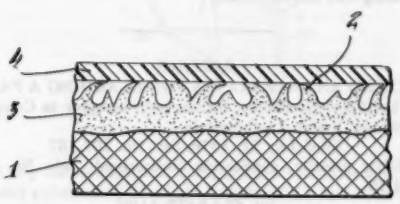
d. applying at least one preformed layer of a substantially non-heat shrinking, precured thermoplastic vinyl-welding compound into the hole, each layer having a fusion temperature about equal to that of the vinyl base material and a high tensile strength relative to the vinyl base material, each layer having substantially the same shape and peripheral dimensions as the hole so that the periphery of each such layer butts against the periphery of the hole; and

e. fusing each layer to the vinyl base material by the application of heat to the vinyl base material.

4,028,161
METHOD OF MAKING SHEET MATERIAL

Osamu Fukushima; Kazuo Nagoshi, and Toshiaki Iwamoto, all of Kurashiki, Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Continuation-in-part of Ser. No. 64,721, Aug. 18, 1970, abandoned. This application Oct. 29, 1974, Ser. No. 518,830
Int. Cl.² B32B 31/20
U.S. Cl. 156—153 10 Claims



1. A process for producing a sheet material having leather-like grain, excellent scuffing and abrasion resistance and superior dyeability, comprising:

forming a finely napped porous polymeric layer having a thickness of about 0.05 to 2.50 mm, a density of about 0.10 to 0.30 g/cc and a nap length of about 0.03 to 0.5

mm, on a fibrous substrate, said layer containing minute pores of about 0.1 to 100 microns in diameter;

treating the finely napped porous polymeric layer with a nap binding agent of the group consisting of a swelling agent for the polymer of the napped porous polymeric layer, solution of a polymer dissolved in the swelling agent and a two-liquid type curable polyurethane elastomer;

compressing the finely napped porous polymeric layer by about 10 to 90% of its original thickness by means of even pressure in order to obtain a layer having a desinty of from 0.20 to 0.50 g/cc; and,

overcoating the resultant compressed material with an upper layer consisting of a non-porous polymeric coating having a thickness of 1 to 100 microns.

4,028,162

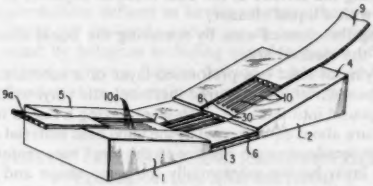
METHOD OF SPLICING PAIRS OF ARRAYED OR INDIVIDUAL FIBERS UTILIZING OPTICAL FIBER ALIGNING GROOVES

Allen Henry Cherin, Doraville, and Philip Jay Rich, Atlanta, both of Ga., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 517,420, Oct. 24, 1974, Pat. No. 3,912,574. This application May 15, 1975, Ser. No. 577,630

Int. Cl.² B65H *69/02*

U.S. Cl. 156—158 **10 Claims**



1. A method for joining a first optical fiber to a second such fiber comprising the steps of:

placing said first and second fibers in respective first and second planes which converge toward each other and intersect a fiber receiving groove in two different places and at a slight angle thereto;

advancing said first and second fibers toward each other along said planes and into said fiber receiving groove, said fibers entering said groove at a slight angle of inclination to said groove sufficient to generate within each fiber a downwardly biasing stress to maintain each said fiber in contact with said groove;

continuing said advancing step until the ends of said first and said second fibers meet in abutting axial alignment; and

joining said abutted fibers.

4,028,163

METHOD AND APPARATUS FOR CLADDING A PANEL

Markus Frey, Greifensee, Switzerland, assignor to Conventa-Stiftung, Vaduz, Liechtenstein

Filed July 21, 1976, Ser. No. 707,187

Claims priority, application Switzerland, July 30, 1975, 9979/75

Int. Cl.² B32B *31/00*

U.S. Cl. 156—229 **12 Claims**

1. A method of cladding panels, particularly doors, with a synthetic plastic foil, comprising the steps of

positioning a panel so that two longitudinal edges thereof extend normal to the axis of rotation of a foil supply roll;

withdrawing a length of foil from said roll and thereafter arresting said roll against rotation;

securing a leading end of said length of foil to a transverse edge of said panel which is remote from said roll;

shifting said panel substantially in its own plane in a path away from said roll to stretch said length of foil;

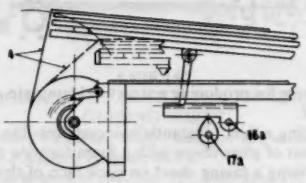
shifting said panel in said path back towards said roll when a predetermined degree of stretch has been achieved, and at the same time imparting to the panel end facing said roll a movement transverse to said path and away from said roll, to maintain said length of foil stretched;

securing the foil intermediate said roll and said panel; and

connecting said foil to the other edge of said panel.

2. Apparatus for cladding a panel, particularly a door, with a foil of synthetic plastic material, comprising

means for rotatably supporting a supply roll of synthetic plastic foil;



guide means extending substantially horizontally from said supply roll in direction normal to the axis of rotation thereof;

a carriage movable on said guide means towards and away from said supply roll, so that when a leading end of a length of foil withdrawn from said supply roll is secured to the remote edge of a door resting on said carriage and the carriage moves away from said supply roll, said length becomes stretched; and

means for uplifting the end of the door which is proximal to said supply roll, in response to movement of said carriage towards said supply roll so as to maintain said length of foil stretched.

4,028,164

PROCESS AND APPARATUS FOR THE CONTINUOUS OBTAINMENT BY DISPLACEMENT OF CYLINDRICAL OR PRISMATIC HOLLOW BODIES PRODUCED WITH FIBRE-REINFORCED SYNTHETIC RESINS

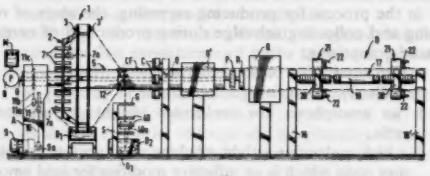
José Salvador Montagut, Calvet 67, Barcelona, Spain

Filed May 30, 1975, Ser. No. 582,086

Claims priority, application Spain, June 5, 1974, 427018; Jan. 21, 1975, 433994

Int. Cl.² B65H *81/00*

U.S. Cl. 156—173 **9 Claims**



1. Improvements in or relating to a process for the continuous manufacture by displacement of an elongated hollow body with fibre-reinforced synthetic resins, obtained by the continuous winding of fibrous elements impregnated with synthetic resin over an elongated mandrel previously covered with resin impregnated support fibres placed parallel to the longitudinal axis of said mandrel, comprising the steps of:

a. rotating the mandrel about an axis parallel to the longitudinally extending direction thereof;

b. providing a plurality of feed stations for supplying said support fibres;

c. rotating said plurality of feed stations about said axis in unison with said mandrel and simultaneously feeding said support fibres from said feed stations to said rotating mandrel;

d. impregnating said support fibres with a liquid resin after they leave said feed stations but before they contact the mandrel;

e. placing said resin impregnated support fibres longitudinally over the continuously rotating mandrel as it rotates in unison with said plurality of feed stations to thus form a fibrous substructure which rotates with the mandrel;

f. displacing the rotating fibrous substructure thus obtained longitudinally along the length of said mandrel in a direction away from the feed stations by pulling on the substructure while preventing relative rotary movement between said substructure and said mandrel;

g. winding a plurality of continuous resin impregnated fibrous elements around said rotating fibrous substructure as it is supported on and being displaced longitudinally along the mandrel to form an elongated hollow body, whereby the fibrous elements extend spirally around the hollow body to form a layer of given thickness;

h. treating the wall of the holow body thus obtained to eliminate trapped air;

f. controlling and correcting defects in the wall of the hollow body;

i. moving said hollow body past a first heating station to at least partially cure and harden the resin;

j. providing a resin distributor head at a location which is spaced downstream from both the heating station and the discharge end of the mandrel;

k. applying a layer of resin of desired thickness to the interior surface of the hollow body by means of said distributor head as said hollow body is moved therepast;

l. moving said hollow body past a second heating station which is located downstream of said distributor head to cure and harden the inner layer of resin; and

m. severing said hollow body into sections of desired length.

2. Improvements in or relating to an apparatus for the continuous manufacture by displacement of a hollow body with fibre-reinforced synthetic resins, comprising:

frame means; an elongated mandrel rotatably mounted adjacent one end thereof on said frame means so that said mandrel projects outwardly from said means in a cantilever manner, said mandrel being supported for rotation about a longitudinally extending axis;

first drive means operatively interconnected to said mandrel for rotating same;

a spool-frame fixedly joined concentrically to said mandrel for rotation therewith, said spool-frame being positioned adjacent said one end of said mandrel and having a plurality of spools supported thereon for feeding a plurality of longitudinal support fibres axially along the periphery of said mandrel to thereby form a fibrous substructure which rotates in unison with said mandrel;

guiding means rotatable with said spool-frame and disposed for guidably deflecting the support fibres after they are removed from the spools but prior to the fibres being positioned adjacent the periphery of said mandrel;

tank means disposed adjacent said guiding means and containing therein a synthetic resin so that said guiding means and the support fibres guided thereon are submerged in said tank means during rotation of said spool-frame and mandrel;

means for winding one or more fibrous elements impregnated with synthetic resin around the rotating fibrous substructure which is supported on and extends longitudinally of the rotating mandrel, said last-mentioned means including stationary support means spaced from said mandrel, said fibrous element body guided from said stationary support means to said mandrel so as to be wound around the fibrous substructure thereon, whereby said fibrous substructure and said fibrous element form a hollow body;

means for eliminating air trapped in the wall of the hollow body;

pulling means for engaging the hollow body and pulling same in its longitudinal direction for displacing said hollow body relative to said mandrel in the longitudinal direction of said mandrel away from said spool-frame, said pulling means including first and second clamping units which are spaced apart from one another in the longitudinal direction of the mandrel, each of said clamping units having movable clamping means adapted for engagement with the hollow body;

second drive means drivingly interconnected to each of said clamping units for rotating said clamping units synchronously with said mandrel about the rotational axis thereof;

third drive means drivingly interconnected to each of said clamping units for causing linear reciprocation thereof in a direction substantially parallel to said rotational axis;

each clamping unit including a first part which is mounted for linear reciprocating movement parallel to said longitudinal direction and is restrained from rotation, said third drive means being drivingly interconnected to said first part; and

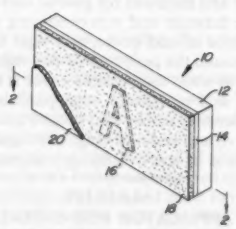
each said clamping unit also including a second part rotatably supported on said first part for rotation about said rotational axis, said second drive means being drivingly interconnected to said second part, and said clamping means being mounted on said second part and disposed for engagement with said hollow body to thereby rotate simultaneously with said hollow body in response to mandrel rotation as said hollow body is being displaced longitudinally of said mandrel.

4,028,165

DRY TRANSFER PRODUCT AND PROCESS

Jerome E. Rosenfeld, 1349 Lexington Ave., New York, N.Y. 10028

Filed June 14, 1976, Ser. No. 695,790
Int. Cl.² B44C 1/16
U.S. Cl. 156—234 **7 Claims**



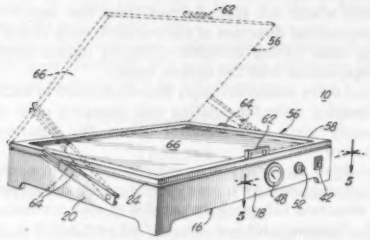
1. A dry transfer material comprising a nonextensible carrier sheet constructed of a light-transmitting polymer film of low extensibility under the stresses of light rubbing or burnishing, said sheet having a polymeric surface layer, said surface layer being substantially non-extensible and being susceptible to penetration by ink-carrying solvents, ink-printed indicia on said polymeric surface layer, said indicia being capable of being transferred to a receptor surface without the application of heat, and a pressure-sensitive adhesive coating overlying said indicia.

4,028,166

APPARATUS FOR LAMINATING SHEET MATERIAL

Charles J. Leonhart, Carol Stream, Ill., assignor to Nuarc Company, Inc., Chicago, Ill.

Filed Oct. 28, 1975, Ser. No. 626,362
Int. Cl.² B30B 9/22; G03B 27/20
U.S. Cl. 156—382 **2 Claims**



1. Apparatus for laminating pieces of sheet material together with adhesive comprising:

a base of rigid material having a flat upper surface formed with a plurality of relatively small size, spaced apart perforations distributed substantially uniformly over said surface;

a rigid base support member having a flat upper surface supporting an underside of said base and having a plurality of concentric grooves interconnected with a plurality of grooves radiating outwardly of a central portion of said support member, said grooves underlying and in communication with said perforations and an upstanding peripheral rib projecting above said flat surface of said base and spaced outwardly of said perforations;

means in communication with said grooves in said central portion of said base support member for developing a partial vacuum in said grooves for causing fluid flow through said perforations around one or more pieces of sheet material placed in contact with said upper surface of said base;

a cover of flexible fluid impervious transparent sheet material movable between non-overlaying and overlaying positions on said base and pieces of said sheet material placed on said base to be laminated together;

and means for sealing between peripheries of said base outwardly of said concentric grooves and said cover when in said overlaying position including a peripheral rigid frame supporting a peripheral edge portion of said flexible cover and mounted for pivotal movement relative to said base between said non-overlaying and said overlaying positions of said cover, said rigid frame including a groove around the periphery of said rigid frame confronting said rib when said flexible cover is in said overlaying position, said peripheral edge portion of said flexible cover extending across said groove and deflectable into said groove into sealing engagement against said rib when said cover is in said overlaying position.

4,028,167

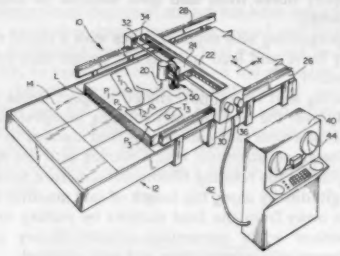
LABEL APPLICATOR FOR AUTOMATICALLY CONTROLLED CUTTING MACHINE

Heinz Joseph Gerber, West Hartford, Conn., assignor to Gerber Garment Technology, Inc., East Hartford, Conn.

Filed July 29, 1976, Ser. No. 709,901
Int. Cl.² B32B 31/00
U.S. Cl. 156—384 **7 Claims**

1. In combination in an automatically controlled cutting machine having a cutting tool and a support table which move relative to one another in a cutting operation to cut pattern pieces from sheet material spread on the support surface of the table, the improvement comprising:

a label applicator mounted with the cutting tool for movement above the support surface of the table relative to the sheet material spread on the table, the applicator including dispensing means for applying information labels



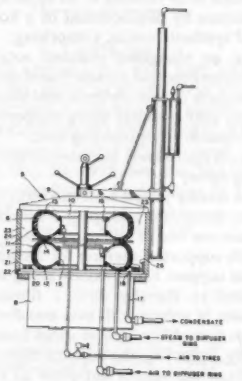
individually to the exposed surface of the sheet material within the periphery of the pattern pieces cut from the material.

4,028,168

KETTLE USED IN THE RETREADING OR REPAIR OF TIRES

Merritt W. Wolfe, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed July 15, 1976, Ser. No. 705,381
Int. Cl.² B29H 5/04
U.S. Cl. 156—394 **12 Claims**



1. A kettle used in the retreading and repair of tires, comprising:

a. a plurality of parts which, when brought together, form a chamber which is sealed from the ambient atmosphere;

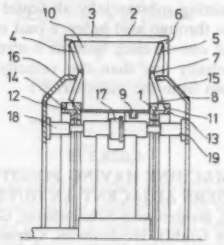
b. means associated with the kettle for simultaneously circulating steam and air, under pressure, within the chamber when it is sealed from the ambient atmosphere, said means including a number of closely spaced inlets through which the steam and the air each pass separately into the chamber, and means for spacing the inlets of the steam in sufficiently close proximity to the inlets of the air to obtain a more nearly uniform temperature within the chamber.

4,028,169

WINDING DRUM FOR PRODUCING BELT INSERTS FOR PNEUMATIC TIRES

Werner Eichholz, and Gerd Krebs, both of Hamburg, Germany, assignors to Phoenix Gummiwerke AG, Hamburg, Germany

Filed Oct. 15, 1975, Ser. No. 622,712
Claims priority, application Germany, Nov. 19, 1974, 2454751
Int. Cl.² B29H 17/16
U.S. Cl. 156—416 7 Claims



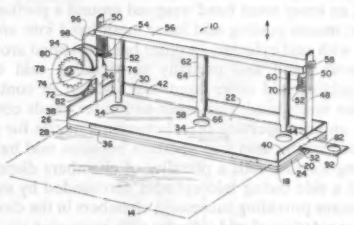
1. A winding drum for producing belt inserts for pneumatic tires, comprising a cylindrical casing having axial outer edges, disks connected with said edges and having radially inwardly extending portions, said disks being foldable to facilitate radial expansion of the casing, an inner drum, said disks having radial inner ends sealed to said drum to form an annular air chamber between the drum and the casing, and supports engaging said disk portions radially outward of said drum at adjustable positions limiting the amount of unfolding which the disks can carry out and thus controlling the radial expansion of the casing.

4,028,170

REINFORCING HOLE PUNCH DEVICE

Sundar Savarimuthu, 17 Glen Eagle Crecent, Willowdale, Ontario, Canada

Filed Aug. 3, 1976, Ser. No. 711,267
Int. Cl.² B32B 31/00
U.S. Cl. 156—513 10 Claims



1. A reinforcing hole punch device for punching a hole in a sheet of material and applying an annularly shaped reinforcing element to said sheet around said formed hole in said sheet, which comprises:

a. a base having a bottom, a plurality of upwardly extending walls, and a top, said base having a channel therein, said channel extending between two said walls, another said wall having an elongated opening therein, said opening extending inwardly into said base to communicate with said channel, said top of said base having at least one circular aperture therein, said circular aperture extending downwardly into said base to communicate with said channel, said elongated opening adapted to receive said sheet therein;

b. a pair of arm members, one arm member affixed to each end of said base and extending upwardly therefrom, each said arm member having an elongated slot therethrough;

c. a rectangularly shaped bar member having a pair of distal ends;

d. a pair of pin elements, each said pin element affixed linearly onto one said distal end of rectangularly shaped bar member, each said pin element slideably disposed in one said elongated slot of one said arm member;

e. means for restricting down movement of said bar member between said arm members;

f. at least one punch element perpendicularly affixed to said bar member, said punch element received in said aperture upon a downward movement of said bar member; and

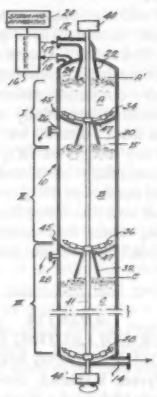
g. means for inserting a plurality of reinforcing elements into said channel for application of said reinforcing elements to said sheet.

4,028,171

METHOD FOR CONTINUOUS TREATMENT OF FIBER MATERIAL IN A VERTICAL ARRAY

Johan C. F. C. Richter, St. Jean Cap Ferrat, France, assignor to Kamyr Aktiebolag, Karlstad, Sweden

Filed July 2, 1975, Ser. No. 592,659
Claims priority, application Sweden, July 5, 1974, 7408858
Int. Cl.² D21C 3/26, 3/24
U.S. Cl. 162—19 5 Claims



1. A method for continuously treating fiber material in a vertical array comprising the steps of

a. establishing a first fiber column of a predetermined height in a liquid-filled first upper treatment zone having first predetermined temperature and pressure conditions, and a first given cross-sectional area,

b. continuously moving individual fibers of said first fiber column downwardly at a first predetermined flow velocity towards a liquid-filled lower second zone having second predetermined temperature and pressure conditions greater than said first predetermined temperature and pressure conditions, and a second given cross-sectional area,

c. forcing individual fibers in said first fibers in said first fiber column from said first zone into said second zone at a second flow velocity greater than said first flow velocity and of a predetermined magnitude great enough to substantially prevent flow of liquid from said second zone into said first zone, by forcing said fiber material through an area between said zones of smaller cross-sectional area than said first and second cross-sectional areas, and

d. forming a second fiber column in said second zone.

4,028,172

PROCESS OF MAKING PAPER

Emil D. Mazzarella, Mountainside, N.J., assignor to National Starch and Chemical Corporation, Bridgewater, N.J.

Continuation-in-part of Ser. No. 460,918, April 15, 1974, abandoned. This application Oct. 23, 1975, Ser. No. 624,732

Int. Cl.² D21D 3/00

U.S. Cl. 162—164 R 4 Claims

1. In a process of making paper the improvement which comprises the step of adding to the wet pulp, prior to its entrance into the press section of the paper machine, a polysiloxane polymer selected from the group consisting of (A) a fluid water-soluble copolymer of dimethylpolysiloxane-polyoxyalkylene ether wherein the alkylene moiety is ethylene, propylene or mixtures thereof, and (B) an aqueous emulsion of dimethylpolysiloxane, said emulsion remaining water dispersible in all proportions, in an amount sufficient to provide a concentration of from about 0.005 to 0.15% of active polymer based on dry fiber weight, thereby substantially or completely eliminating the problem of wet press picking.

4,028,173

METHODS OF MAKING COMBINED TITANIUM DIOXIDE AND CALCIUM CARBONATE AND OPAQUE PAPER CONTAINING THE RESULTING COMBINATION

Robert A. Olson, York New Salem, Pa., assignor to P. H. Glatfelter Co., Spring Grove, Pa.

Filed Aug. 15, 1975, Ser. No. 605,216

Int. Cl.² D21D 3/00

U.S. Cl. 162—181 A 9 Claims

1. In a method of making opaque paper containing pigment wherein said pigment is added to a paper furnish and the resulting mixture is formed into sheets and water is removed, that improvement comprising preparing said pigment by mixing an aqueous slurry consisting essentially of TiO_2 with an aqueous slurry consisting essentially of $CaCO_3$ in amounts adequate to provide from 10 to 50 wt. % of $CaCO_3$ based on the total combined dry weight of TiO_2 and $CaCO_3$ to form a slurry consisting essentially of a combined TiO_2—$CaCO_3$ pigment; adding said combined TiO_2 — $CaCO_3$ pigment slurry to said paper furnish and thereafter forming said furnish into sheets and removing water said combined pigment in said paper having essentially the same scattering coefficient as 100% TiO hd 2.

4,028,174

APPARATUS FOR COLLECTING LIQUIDS THROWN FROM A MOVING MEMBER

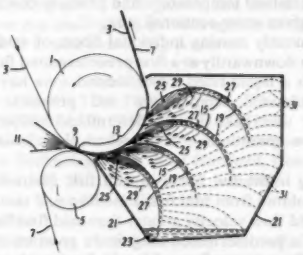
Harry Ingemar Myren, Karlstad, Sweden, assignor to Aktiebolaget Karlstads Mekaniska Werkstad, Karlstad, Sweden

Filed May 14, 1976, Ser. No. 686,290

Claims priority, application Sweden, Nov. 19, 1975, 7512988

Int. Cl.² D21F 1/66

U.S. Cl. 162—264 3 Claims



1. In apparatus including a moving member from which liquid is thrown during movement thereof and at least one plate-like deflector positioned adjacent the member to intercept at least a portion of said liquid, the deflector extending generally transverse to the direction of movement of the member and having an inner edge located close to the member and an outer edge located remote from the member, and further having a curved transverse cross-section which is generally concave to the direction of movement of the liquid thrown from the member such that it intercepts and collects the liquid thereon as a moving layer, the improvement comprising means defining a multiplicity of holes located in a portion of the deflector adjacent to the outer edge and in a band along the length of the deflector remote from the member where substantially no liquid thrown from the member directly impinges for permitting substantially all liquid collected by the deflector to pass through said holes, a part of the liquid passing through and out of each hole as a stream moving at a velocity substantially less than the velocity with which the liquid was thrown from the member.

4,028,175

CYLINDER MACHINE HAVING POSITIVE PRESSURE CHAMBERS ADJACENT AN OUTER BAND

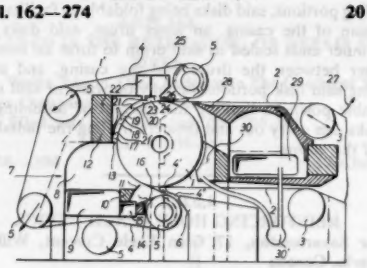
Christian Schiel, Heidenheim-Schnaitheim, Germany, assignor to J. M. Voith GmbH, Heidenheim, Germany

Continuation of Ser. No. 554,425, March 3, 1975, abandoned. This application June 25, 1976, Ser. No. 699,949

Claims priority, application Austria, Mar. 13, 1974, 2074/74

Int. Cl.² D21F 1/04

U.S. Cl. 162—274 20 Claims



1. A paper making machine comprising: a hollow cylinder rotatable in a predetermined direction and having a porous surface; an inner mesh band wrapped around a portion of said cylinder; means guiding said inner mesh band into and out of contact with said cylinder; an outer band wrapped around said inner mesh band and partially surrounding said cylinder; means guiding said outer band into and out of contact with said inner mesh band, said inner and outer bands converging to form an inlet aperture therebetween; a nozzle for spraying suspended matter into said aperture between said bands; and a housing formed with a plurality of chambers disposed and open on a side facing said cylinder surrounded by said outer band, means providing successive chambers in the direction of operative rotation of said cylinder with increasing air pressure, the entire inner surface of said cylinder being subjected to a uniform pressure smaller than the pressure exerted on the part thereof surrounded by said outer band.

4,028,176

NUCLEAR REACTOR INSTALLATION

Werner Kraupa, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 5, 1974, Ser. No. 503,462

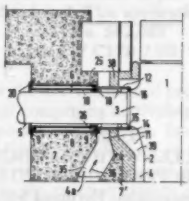
Claims priority, application Germany, Sept. 17, 1973, 2346638

Int. Cl.² G21C 9/00

U.S. Cl. 176—38 5 Claims

1. A nuclear reactor installation comprising a reactor pres-

sure vessel, a concrete biological shield having a wall surrounding said vessel, and a cylindrical pressurized water coolant pipe extending from said vessel, said wall forming a hole of substantially larger diameter than the diameter of said pipe and through which the pipe is extended with a cylindrical space therearound, and the wall forming at least one air space between said vessel and the wall and which is spanned by the pipe; wherein the improvement comprises a cylindrical containment encircling said pipe and extending through said



cylindrical space to and in contact with said vessel and having an open exhaust end at the outside of said wall, said tubular containment being axially slidable on said pipe and forming a pressurized coolant containment space around the pipe, said containment having an inner end and an inwardly extending flange on this inner end, said flange having an inner periphery and said vessel forming an annular seat on which the inner periphery of said flange seats to close said containment space from said air space.

4,028,177

PROVISION FOR COOLING THE TOP END OF A SUSPENDED VESSEL, SUCH AS THE PRESSURE VESSEL OF A NUCLEAR REACTOR

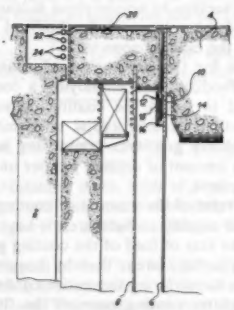
Henri Failla, Aix-en-Provence; Karl Schaller, Valen Sole, and Michel Vidard, Aix-en-Provence, all of France, assignors to Commissariat A l'Energie Atomique, Paris, France

Filed Aug. 29, 1975, Ser. No. 609,166

Claims priority, application France, July 2, 1975, 75.20820; Aug. 30, 1974, 74.29648

Int. Cl.² G21C *15/00*

U.S. Cl. 176—38 **10 Claims**



1. Means for cooling the top end of a pressure vessel of a nuclear reactor, suspended from a cover and containing a primary liquid at a first temperature, comprising coils receiving a flow of a second liquid coolant at a temperature lower than that of the primary liquid, the coils being out of contact with the primary liquid and in contact with an intermediate heat-conducting material isolated from the primary liquid and in contact with the top end of the vessel.

4,028,178

SYSTEM FOR THE HEAT INSULATION OF HORIZONTAL CLOSURE SURFACES FOR A LIQUID METAL COOLED NUCLEAR REACTOR

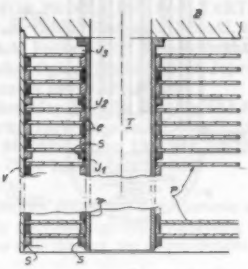
René Jullien, Veurey-Voroise; Maurice Perona, Varces, and Robert Venot, Fontenay-aux-Roses, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Sept. 5, 1975, Ser. No. 610,850

Claims priority, application France, Sept. 6, 1974, 74.30347

Int. Cl.² G21C *13/06*

U.S. Cl. 176—38 **4 Claims**



1. A system for the heat insulating of horizontal pressure vessel closure surfaces in a nuclear reactor with respect to a hot gaseous medium which is present within the pressure vessel, comprising a containment vault, a roof for said vault, rotatable shield plugs in said roof, substantially coplanar horizontal inner surfaces for said roof and said plugs, an assembly of uniformly spaced metallic plates including a bottom plate of substantial thickness extending parallel to said surfaces, a first vertical cylindrical shell surrounding said plates and entering said roof surface, second vertical cylindrical shells within said shell surrounding said plugs and entering said roof surface, said bottom plate of substantial thickness being suspended from said horizontal surfaces to be heat-insulated by means of suspension members disposed in spaced relation on the surface of said bottom plate and attached at the upper extremities thereof to said horizontal surfaces and at the lower extremities thereof to said plate of substantial thickness, said plate of substantial thickness supporting said metallic plates stacked one above the other by spacer members, said metallic plates being protected on the sides by said first shell, and said first and second shells being joined to said plate of substantial thickness in leak-tight manner for free expansion at the upper portion thereof.

4,028,179

NUCLEAR REACTOR CORE SAFETY DEVICE

Stirling A. Colgate, 4616 Ridgeway Ave., Los Alamos, N. Mex. 87544

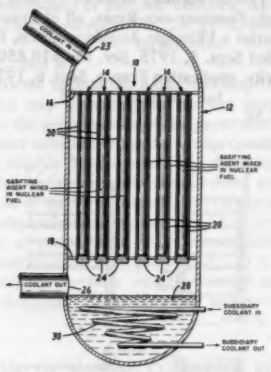
Filed Jan. 22, 1976, Ser. No. 651,514

Int. Cl.² G21C *9/00*

U.S. Cl. 176—38 **15 Claims**

1. In a liquid cooled nuclear reactor having a vessel, and a multiplicity of fuel rods having fissionable fuel contained in an enclosing jacket mounted in the core, and a residual liquid coolant bath in the vessel located essentially below the core in the bottom of the vessel, said fuel rod jackets having a blow-out means disposed to release the fuel rod contents into said residual coolant bath when a blow-out pressure is reached, the improvement comprising a gasifying agent in the fuel rods, the gasifying agent being passive at normal operating temperatures of the core and generating an inert gas at a predetermined elevated temperature between said operating temperatures and the melting temperature of the fuel rod, the agent being in an amount in relation to the blow-out plug and so disposed relative to the fuel in said fuel rod that upon gasifying it will release a gas volume sufficient to rupture said blow-out

means, and expel the fuel from the fuel rods into the residual coolant bath to prevent melt-down of the core, whereby fluid-



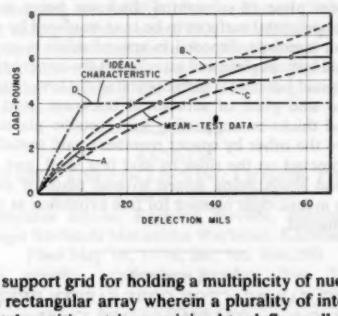
fluid explosive self-mixing of a molten mixture of fuel rod contents and the residual coolant bath is avoided.

4,028,180

SUPPORT GRID FOR FUEL ELEMENTS IN A NUCLEAR REACTOR

Lester M. Finch, Pasco, Wash., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 16, 1976, Ser. No. 667,815
Int. Cl.² G21C 3/30
U.S. Cl. 176—78 **1 Claim**



1. In a support grid for holding a multiplicity of nuclear fuel rods in a rectangular array wherein a plurality of intersecting sheet metal partition strips are joined to define cells for individually receiving said fuel rods, a plurality of resilient springs and rigid support dimples being formed in said partition strips whereby each of said fuel rods are supported against lateral displacement by at least two of said resilient springs and at least two of said rigid dimples disposed in opposition to said springs; the improvement characterized by said support dimples being formed between a pair of parallel slots, said resilient springs each comprising a toggle spring arm formed from said partition strip by a pair of elongated parallel slots in said partition strips perpendicular to said dimple slots and extending from near one of said support dimples to near another of said support dimples leaving a cross arm of said partition strip at each end of said spring arm perpendicular thereto, said toggle spring arm also having protrusions at each of said ends and a central larger protrusion all extending in the same direction with essentially straight members interconnecting said protrusions, each of said toggle springs arms normally being slightly convexed toward the interior of a corresponding cell on one side of said partition strip to engage a fuel rod extending therethrough and adapted to toggle through a null point by flexing of said spring arm and said cross-members to a slightly concave shape on the other side of said partition strip upon lateral deflection of said fuel rod, said spring arm and cross-member having nonlinear generally S-shaped force-deflection characteristics.

4,028,181

FUEL PARTICLES WITH COATINGS WITHOUT PROPERTY GRADIENTS

Hans Huschka, Grossauheim; Hermann Schmutz, Hanau, and Peter Vygen, Kalberau, all of Germany, assignors to Nukem G.m.b.H., Wolfgang near Hanau am Main, Germany

Continuation-in-part of Ser. No. 162,225, July 13, 1971, abandoned. This application Apr. 3, 1974, Ser. No. 457,618
Claims priority, application Germany, July 23, 1970, 2036545
Int. Cl.² E21B 7/04
U.S. Cl. 176—82 **4 Claims**

1. A process for the production of coated nuclear fuel particles in a fluidized bed employing a coating gas and a carrier gas and in which the coating consists of pyrolytic carbon substantially free of radial uniformly disposed and alternating property gradients comprising holding constant the ratio of the amount of coating gas per unit of time to the coating surface area,

wherein the ratio of the amount of coating gas per unit of time to the coating surface area is kept constant by drawing off a part of the particules from the fluidized bed during the coatings to hold the total particle surface area constant; thereby keeping the speed of growth the same during the entire coating time and also over the entire coating zone of the fluidized bed and thereby maintaining the fluctuations of the speed of growth within boundaries which boundary speeds are related each to a lower and an upper value of the Bacon Anisotropy Factor wherein said coating step is undertaken in a tube with a conical bottom equipped with nozzles for introducing the coating gas into the tube from the nozzles wherein the ratio of the working tube cross section to nozzle cross section is 150 and the ratio of the volume of the fluidized particles to the volume of the coating zone is 1.

3. A process for the production of coated nuclear fuel particles in a fluidized bed employing a coating gas and a carrier gas and in which the coating consists of pyrolytic carbon substantially free of radial uniformly disposed and alternating property gradients comprising holding constant the ratio of the amount of coating gas per unit of time to the coating surface area,

wherein the ratio of the amount of coating gas per unit of time to the coating surface area is kept constant by increasing the rate of feed of the coating gas with increase in coating surface area; thereby keeping the speed of growth the same during the entire coating time and also over the entire coating zone of the fluidized bed and thereby maintaining the fluctuations of the speed of growth within boundaries which boundary speeds are related each to a lower and an upper value of the Bacon Anistropy Factor wherein said coating step is undertaken in a tube with a conical bottom equipped with nozzles for introducing the coating gas into the tube from the nozzles wherein the ratio of the working tube cross section to nozzle cross section is 150 and the ratio of the volume of the fluidized particles to the volume of the coating zone is 1.

4,028,182

MICROBIOLOGICAL SYNTHESIS OF PROTEINACEOUS MATERIAL EMPLOYING NORMALLY GASEOUS HYDROCARBON SUBSTRATE AND THE PRODUCTS THEREOF

James E. Zajic, London, and Bohumil Volesky, St. Lambert, both of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Continuation-in-part of Ser. No. 316,151, Nov. 18, 1972, abandoned, which is a continuation-in-part of Ser. No. 55,810, July 17, 1970, abandoned. This application Mar. 26, 1975, Ser. No. 562,085

Int. Cl.² C12B *1/00*

U.S. Cl. 195—28 R 18 Claims

1. A process for the microbiological preparation of protein containing material comprising cultivating aerobically a protein producing species of Graphium fungus having all the characteristics of Graphium UWO 27 in a fermentation medium containing a nitrogen source and a hydrocarbon substrate selected from the group consisting of methane, ethane, propane, butane and mixtures of two or more of said hydrocarbons and separating the protein containing material from the fermentation medium.

4,028,183

PROCESS OF PREPARING DOUBLE SALTS OF S-ADENOSYL-L-METHIONINE

Alberto Fiecchi, Milan, Italy, assignor to Bioresearch Limited, Milan, Italy

Division of Ser. No. 482,153, June 24, 1974, Pat. No. 3,954,726. This application Jan. 29, 1976, Ser. No. 653,655

Claims priority, application Italy, June 27, 1973, 25895/73; May 24, 1974, 23148/74

Int. Cl.² C12D *13/02*

U.S. Cl. 195—28 N 3 Claims

1. Process for preparing double salts of S-adenosyl-L-methionine (SAM) with sulphuric acid and p-toluenesulphonic acid comprising a) preparing a concentrated solution of SAM by enzymatic synthesis by the action of the specific enzyme ATP-methionineadenosyltransferase at high purity on a mixture of adenosine triphosphate (ATP) and methionine; b) precipitating the SAM present in the solution by acidifying with a solution of picrolonic acid; c) dissolving the produced SAM picrolonate in a mixture consisting of equal parts by volume of an aqueous solution of equal normalities of p-toluenesulphonic acid and sulphuric acid, and an organic solvent partially miscible with water; d) precipitating the SAM salt from the aqueous layer by a ketone or alcohol based solvent totally soluble in water; e) dissolving the precipitated salt in a solution of p-toluenesulphonic acid in methanol; and f) precipitating the double salt of SAM with sulphuric acid and p-toluenesulphonic acid by a suitable organic solvent.

4,028,184

PROCESS FOR PRODUCING 3',5'-CYCLIC ADENYLIC ACID

Jiro Ishiyama; Motohiko Kato, both of Noda; Fumihiko Yoshida, Matsudo, and Tamotsu Yokotsuka, Nagareyama, all of Japan, assignors to Kikkoman Shoyu Co., Ltd., Noda, Japan

Continuation-in-part of Ser. No. 592,061, June 30, 1975, abandoned, which is a continuation of Ser. No. 405,897, Oct. 12, 1973, abandoned. This application Apr. 2, 1976, Ser. No. 673,067

Claims priority, application Japan, Oct. 16, 1972, 47-102780

Int. Cl.² C12D *13/06*

U.S. Cl. 195—28 N 9 Claims

1. A process for producing 3', 5'-cyclic adenylic acid which comprises culturing under aerobic conditions a strain of microorganism, capable of producing 3', 5'-cyclic adenylic acid without using a precursor thereof and in the absence of fluoride, said microorganism being selected from the group consisting of microorganisms belonging to the genera Corynebacterium, Arthrobacter and Microbacterium, in a medium containing carbon and nitrogen sources, inorganic nutrient substances and no precursor at pH 5–9, at a temperature of 20° – 40° C until 3', 5'-cyclic adenylic acid is accumulated in the medium, and recovering 3', 5'-cyclic adenylic acid from the medium.

4,028,185

METHOD FOR PRODUCING L(+)-TARTARIC ACID

Yoshio Kamatani, Osaka; Hisayoshi Okazaki, Kyoto; Ko Imai, Osaka; Noriaki Fujita, Suita; Yoshio Yamazaki, Toyonaka, and Katsuhiko Ogino, Osaka, all of Japan, assignors to Takeda Chemical Ind., Ltd., Japan

Filed May 6, 1976, Ser. No. 683,802

Claims priority, application Japan, May 7, 1975, 50-54956; May 7, 1975, 50-54957; June 23, 1975, 50-78124

Int. Cl.² C12D *1/02*

U.S. Cl. 195—30 6 Claims

1. In a method for producing L(+)-tartaric acid or calcium salts thereof by microbiologically hydrolyzing epoxy-succinic acid or calcium salts thereof, the improvement of which comprises;

A. preparing a culture medium containing calcium cis-epoxysuccinate of particle size not larger than 100 microns,

B. incubating in said culture medium a microorganism which is capable of hydrolyzing cis-epoxysuccinic acid to L(+)-tartaric acid, thereby converting said calcium cis-epoxysuccinate into calcium L(+)-tartarate.

4,028,186

PROCESS FOR THE PRODUCTION OF SACCHARIFIED STARCH PRODUCTS

Shuzo Sakai, Okayama, Japan, assignor to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo, Okayama, Japan

Filed July 10, 1975, Ser. No. 594,679

Claims priority, application Japan, Nov. 30, 1974, 49-137174

Int. Cl.² C12D *13/02*

U.S. Cl. 195—31 R 1 Claim

1. A process for the production of saccharified starch products with a higher maltose purity (percent maltose, d.s.b.) comprising subjecting a starch hydrolysate with an 80% or more maltose purity to the action of a fungal alpha-amylase with a maltotriose-decomposing activity versus dextrinogenic activity ratio of 0.001–0.1 wherein the hydrolysate has a concentration of 2.0–30.0% and said step of subjecting to the action of a fungal alpha-amylase is at a temperature of 30°–70° C and a pH of 3.0–9.0.

4,028,187

METHOD OF OBTAINING UROKINASE

Abe Tsutomu; Hashino Yasuo, and Kobayashi Hidehiko, all of Fuji, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed July 1, 1976, Ser. No. 701,930

Claims priority, application Japan, July 4, 1975, 50-81969

Int. Cl.² C07G *7/026*

U.S. Cl. 195—66 B 13 Claims

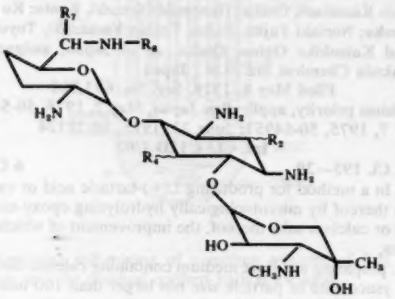
1. A method of obtaining urokinase from human urine comprising contacting human urine with an acrylonitrile polymer of a porous structure having a porosity of not less than 10% and a specific surface area of 5 m^2/g. to adsorb urokinase onto said acrylonitrile polymer, said porous structure having been formed at the time of polymerization for formation of the polymer, and subsequently eluting the urokinase from said acrylonitrile polymer having the urokinase adsorbed thereon.

4,028,188
AMINOCYCLITOL ANTIBIOTICS

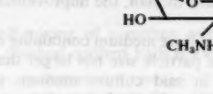
Sol J. Daum, Albany, and Robert L. Clarke, Bethlehem, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 550,273, Feb. 18, 1975, Pat. No. 3,972,930. This application Jan. 21, 1976, Ser. No. 651,034
Int. Cl.² C12D 9/14
U.S. Cl. 195—96 1 Claim

1. A process for preparing compounds having the formula:



where R_2 represents hydrogen or hydroxy; R_4 represents hydrogen, hydroxy or halogen, except that when R_2 is hydrogen, R_4 is not hydroxy cis to the amino groups at the 1- and 3-positions; and R_6 and and R_7 each represent hydrogen or methyl which comprises culturing a nutrient medium containing carbohydrates, a source of assimilable nitrogen, essential salts, an added aminocyclitol having the formula:



where R_2 and R_4 have the meanings given above, and *Micromonospora purpurea* ATCC 31,119 until said compounds are produced, and isolating said compounds from the culture medium.

4,028,189
PROCEDURE AND DEVICE FOR RAPID COMPOSTING OF ORGANIC WASTE

Bjørn Fagerhaug, Skarer, and Karl Øberg, Nesoya, both of Norway, assignors to Kvaerner Brug A/S, Oslo, Norway

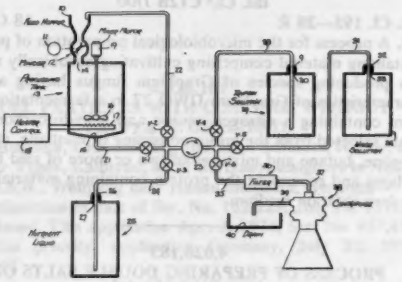
Filed Aug. 26, 1975, Ser. No. 608,017
Claims priority, application Norway, Jan. 23, 1975, 750211
Int. Cl.² C12B 1/14
U.S. Cl. 195—109 8 Claims

1. A procedure for rapid composting of organic waste substances, comprising rotating a cylinder about its axis with its axis substantially horizontal, introducing waste substance into one end of said cylinder and withdrawing waste substance from the other end of said cylinder thereby to establish in said cylinder a mass of said waste substance that has an exposed upper surface within the cylinder whereby upon rotation of the cylinder, portions of the waste substance slide on said surface, introducing air into said mass from within said mass from locations distributed along the length of said mass in said cylinder and below said surface, and withdrawing gas from within said cylinder above said surface from locations distributed along the length of said cylinder.

4,028,190
APPARATUS FOR PREPARING ISOLATED CELLS FROM TISSUE

William J. McAleer, Ambler, and William M. Hurni, North Wales, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 521,922, Nov. 7, 1974, abandoned. This application Nov. 17, 1975, Ser. No. 632,610
Int. Cl.² C12K 9/00
U.S. Cl. 195—127 11 Claims

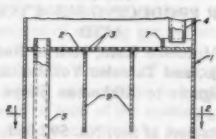


1. A closed semi-automated apparatus for producing primary cell suspensions from tissue which includes:
a shredder device for shredding the tissue;
a processing vessel adapted for contacting the shredded tissue with an enzyme solution to break down intercellular material thereby freeing tissue cells;
first inlet means for feeding tissue from the shredder into the processing vessel;
second inlet means for feeding enzyme into the processing vessel;
means for separating cells from the enzyme solution and
a source of nutrient liquid and means for feeding the nutrient liquid to the means for separating cells from the enzyme solution.

4,028,191
FRACTIONATION COLUMN WITH VAPOR CHANNELING BAFFLES

Norman H. Scott, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 533,053, Dec. 16, 1974, abandoned. This application June 10, 1976, Ser. No. 694,871
Int. Cl.² B01D 3/14
U.S. Cl. 202—158 5 Claims



1. An apparatus for fractional distillation which comprises:
a. a vertically oriented cylindrical outer vessel having an internal volume;
b. an upper first fractionation tray horizontally disposed across the internal volume of said outer vessel and having a lower surface;
c. a second fractionation tray having an upper surface adapted to support a liquid and froth thereupon and

horizontally disposed across the internal volume of said outer vessel below said first fractionation tray, said first and second fractionation trays being vertically contiguous;

d. a first downcomer means extending downward from said first fractionation tray to a point above said second tray;

e. a second downcomer means having an upper inlet opening and extending downward from said second fractionation tray;

f. an outlet liquid flow control means comprising a vertical weir attached to the upper surface of said second fractionation tray and operatively positioned at the upper inlet opening of said second downcomer means; and,

g. at least two substantially parallel, planar, vertical vapor baffles of substantially equal length, said baffles comprising a means distinct and separate from a downcomer means, and extending downward from said lower surface of said first fractionation tray to a common lever above said outlet liquid flow control means and above the liquid level on said second fractionation tray to a common length sufficient to minimize intermixing of vapor around the tops of said vapor baffles, said vapor baffles being oriented substantially perpendicular to a horizontal straight line between the vertical centerlines of said first downcomer means and said second downcomer means, said vapor baffles abutting the lower surface of the first tray.

4,028,192
APPARATUS FOR RECEIVING INCANDESCENT COKE FROM RESPECTIVE COKE OVENS IN A BATTERY AND FOR REMOVING THE COKE IN A CLOSED CHAMBER AWAY FROM THE BATTERY

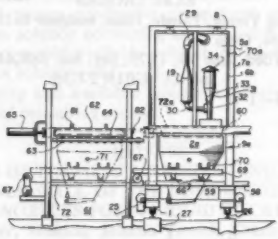
Martin Bender, Dusseldorf; Johannes Knappstein, and Josef Stratmann, both of Recklinghausen, all of Germany, assignors to Firma Carl Still and Hartung, Kuhn & Co. Maschinen fabrik GmbH, both of, Germany

Filed Nov. 26, 1975, Ser. No. 635,285

Claims priority, application Germany, Nov. 26, 1974, 2455830

Int. Cl.² C10B *39/00*

U.S. Cl. 202—227 **9 Claims**



1. Apparatus for receiving incandescent coke from respective coke ovens of a horizontally arranged battery of coke ovens, comprising a wheeled carriage adapted to be moved backwardly and forwardly along the battery of coke ovens, a coke receiving device on said carriage including a closed hood portion adapted to be positioned into alignment with each of the ovens for the discharging of coke therefrom by the movement of said carriage and a tank portion below and enclosed by said hood, gas purifying means associated with said hood portion for removing impurities from the gases and discharging the purified gases, said coke hood portion having openable and closable lateral door means for receiving the incandescent coke from the oven and for closing the hood after receiving of the coke, said tank portion being located below said hood portion in a position to receive the coke discharged from the coke ovens through said hood portion, engagement means on said coke receiving device, and transport means movable along on said carriage and engageable with said engagement means to lift at least said tank portion off said carriage and to transport at least said tank away from said undercarriage.

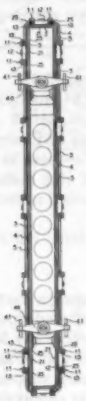
4,028,193
COKE OVEN DOOR

Konno Nagayoshi, Tokyo, Japan, assignor to Koritsu Kikaikogyo Co., Ltd., Japan

Filed Apr. 19, 1976, Ser. No. 677,965

Int. Cl.² C10B *1/06, 25/06*

U.S. Cl. 202—248 **3 Claims**



1. In a self-sealing coke oven door having an inner adiabatic door plug and an outer metallic door body,

a latch bar connected to said door body,

complementary latching hooks for engaging said latch bar for securing said oven door in the closed position,

and a door seal circumscribing the periphery of said oven door, the improvement comprising:

a base plate connected to said metallic door body,

a guard plate spaced from said base plate,

said guard plate being disposed between said adiabatic door plug and said base plate,

an adiabataic layer disposed in the space between said base plate and guard plate,

said guard plate shielding the entire inner surface of said adiabatic layer,

a sealing means in the form of a knife-like sealing edge circumscribing said guard plate,

said knife edge seal being adapted to engage a door frame defining an oven door opening,

and said knife edge seal having a series of circumferentially spaced U-shaped slots formed therein opposite said sealing edge, and having projections disposed on the outer surface of said seal on both sides of said slots,

and a plurality of means for adjustably biasing said sealing means into sealing position,

said biasing means including a seal depressor engaging said edge seal,

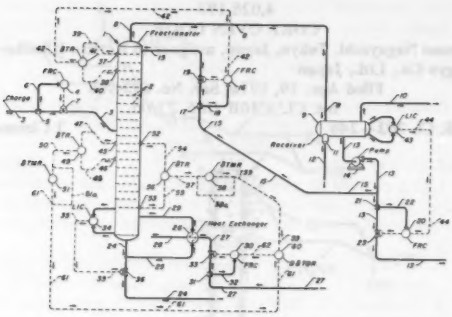
a spring biasing said depressor,

and hook shaped levers adjacent said biasing means for engaging said projections to resist the spring bias acting on said seal means when the door is moved to an opened position.

4,028,194
SYSTEMATIZED METHOD AND CONTROL OF FRACTIONATION HEAT BALANCE

David M. Boyd, Claredon Hills, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Dec. 29, 1975, Ser. No. 644,988
Int. Cl.² B01D 3/42
U.S. Cl. 203—2 7 Claims



7. A method for controlling a fractionation column, wherein (i) a feed stream is introduced through a locus intermediate the top and bottom thereof; (ii) liquid bottoms material is recovered from the lower end of said column, and at least a portion thereof is partially vaporized and returned to the reboiler section; and, (iii) vaporous overhead material is recovered from the upper end of said column, condensed and at least a portion thereof returned to the rectification section as a reflux stream, which method comprises the steps of:

a. sensing a first temperature differential between two vertically-spaced temperature sensing points below said feed locus, separated by a first plurality of trays, measuring the resulting first differential-temperature and generating a first signal representative thereof; (*a*) (*b*) (*c*) (*d*)

b. sensing a second temperature differential between two vertically-spaced temperature sensing points below said feed locus, separated by a second plurality of trays which is greater than said first plurality of trays, measuring the resulting second differential temperatue and generating a second signal representative thereof;

c. multiplying a selected one of said first and second differential temperature signals by a multiplier representing the ratio of the number of trays between the sensors supplying the non-selected differential temperature signal to the number of trays between the sensors supplying said selected differential temperature signal, and generating a third signal representing the resulting product;

d. obtaining a computed relationship of said third signal and said non-selected signal, and generating a fourth signal representative of the resulting computed relationship;

e. regulating the degree to which said liquid bottoms material is vaporized in response to said fourth signal;

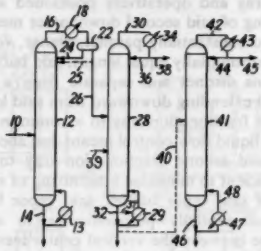
f. sensing a third temperature differential between two vertically-spaced temperature sensing points above said feed locus, measuring the resulting third differential temperature and generating a fifth signal representative thereof; and,

g. regulating the quantity of said returned reflux stream responsive to said fifth signal.

4,028,195
RECOVERY OF ALKYLENE GLYCOLS BY DISTILLATION WITH AQUEOUS ORGANIC ACID

Mitchell Becker, Teaneck, and Charles C. Yang, Hackensack, both of N.J., assignors to Halcon International, Inc., New York, N.Y.

Filed Sept. 12, 1975, Ser. No. 612,827
Int. Cl.² B01D 3/34; C07C 29/26
U.S. Cl. 203—38 5 Claims

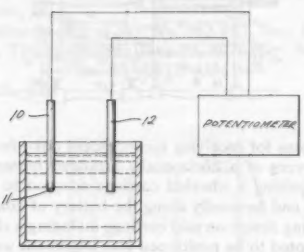


1. A process for purifying by distillation ethylene glycol or propylene glycol admixed with the lower alkanoate monoester of said glycol and an azeotroping agent originating from a previous distillation to produce a purified glycol substantially free from said azeotroping agent, said monoester and the corresponding ortho ester, which tends to form during said distillation which comprises introducing said glycol to be purified into a fractional distillation zone, introducing at least one of an aqueous acetic acid and an aqueous formic acid in said zone at a point below the point of introduction, into said zone of said glycol to be purified in an amount sufficient to substantially suppress the formation of said ortho ester and recovering purified glycol from the lower portion of said zone.

4,028,196
PH RESPONSIVE GLASS COMPOSITIONS AND ELECTRODES

Chung-Chang Young, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed June 19, 1975, Ser. No. 588,446
Int. Cl.² G01N 27/36
U.S. Cl. 204—1 T 26 Claims



1. A glass composition for use in pH responsive glass electrodes consisting essentially of:

Component	Mole %
Li_2O	30–40
SiO_2	50–60
La_2O_3	2–8
Ta_2O_5	2–8
Cs_2O	0–3
wherein $Li_2O+Ta_2O_5$	$\geq$34

4,028,197

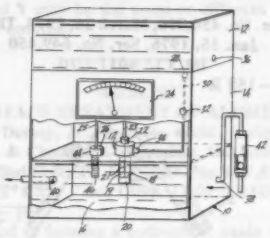
METHOD FOR MONITORING AVAILABLE CHLORINE IN SWIMMING POOLS

Italo A. Capuano, Orange, Conn., assignor to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 456,088, March 29, 1974, Pat. No. 3,956,094. This application Dec. 31, 1975, Ser. No. 645,582

Int. Cl.² G01N 27/46

U.S. Cl. 204—1 T 13 Claims



1. A method for measuring the available halogen concentration of an aqueous solution in the absence of an applied potential comprising:

1. providing a sensing electrode having a porous conductive component and a reference electrode in a measuring zone,
2. connecting a potential measuring means between said sensing electrode and said reference electrode,
3. introducing said aqueous solution containng said available halogen into said measuring zone,
4. contacting said porous conductive component of said sensing electrode and said reference electrode with said aqueous solution containing available halogen,
5. passing a pH control solution through at least a portion of said porous conductive component of said sensing electrode, said pH control solution cleansing said portion of said porous conductive component and said pH control solution controlling the pH at said surface of said portion of said porous conductive component contacting said aqueous solution containing said available halogen,
6. measuring said available halogen concentration in said aqueous solution, and
7. indicating said available halogen concentration on said potential measuring means.

4,028,198

METHOD OF FORMING A REINFORCING LAYER ON THE INNER WALL OF THE COMBUSTION AND/OR THRUST NOZZLES FOR A LIQUID ROCKET ENGINE

Otto Tuscher, Munich; Johann Tewich, Ottobrunn, both of Germany, and Willibald Wittich, deceased, late of Ottobrunn, Germany, assignors to Messerschmitt-Bolkow-Blohm GmbH, Munich, Germany

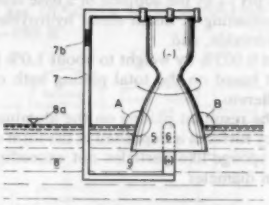
Filed Feb. 10, 1975, Ser. No. 548,619

Claims priority, application Germany, Feb. 14, 1974, 2406976

Int. Cl.² C25D 1/02, 5/16

U.S. Cl. 204—9 6 Claims

1. A method of forming the combustion chamber and/or thrust nozzle of a liquid rocket engine having an inner wall and an outer wall with laterally spaced cooling ducts located between the inner wall and outer wall and formed by shaping the inner wall with laterally spaced inwardly extending projections forming troughs closed by the outer wall and the inwardly facing surface of the inner wall having a corrugated-like shape, comprising the steps of electroplating a layer on a core having the negative form of the inner wall with the troughs formed therein for forming the inner wall with the cooling ducts, and removing the core, wherein the improvement comprises, after the removal of the core, electroplating a reinforcing layer at least on the radially inwardly projecting portions of the inner surface of the inner wall the radially outer surfaces of which projecting portions in combination with the radially inwardly facing surfaces of said outer wall define the



cooling ducts, and effecting the electroplating by positioning the inner wall within an electrolytic bath and locating a material-depositing electrode within the bath equidistantly spaced radially inwardly of the inner wall.

4,028,199

METHOD OF PRODUCING METAL POWDER

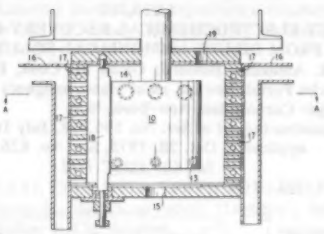
Frank Stanley Holland, Stockport, England, assignor to National Development Research Corporation, London, England

Continuation-in-part of Ser. No. 495,003, Aug. 5, 1974, abandoned. This application July 30, 1975, Ser. No. 600,253

Claims priority, application United Kingdom, Feb. 25, 1975, 7736/75

Int. Cl.² C25C 5/00, 5/02, 1/16

U.S. Cl. 204—10 32 Claims



1. A method of producing a metal powder from a dilute aqueous solution of the metal which solution has a low concentration of the metal ion, said method comprising the steps of subjecting the dilute aqueous solution of the metal to electrolysis in a cell having a rotating cylinder cathode, the current density of the cathode being proportional to the peripheral speed of the rotating cylinder cathode to the power of a number between 0.7 and 1.0 whereby the metal is deposited as a powder on the cathode, and recovering metal powder from the cathode.

4,028,200

PLATING BATHS FOR DEPOSITING COBALT-LEAD NICKEL-LEAD ALLOYS OR COMBINATIONS THEREOF AND METHOD OF COATING ALUMINUM ARTICLES THEREWITH

Kostas F. Dockus, Cicero, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Division of Ser. No. 589,992, June 24, 1975, Pat. No. 3,970,237, which is a continuation-in-part of Ser. No. 304,457, Nov. 7, 1972, abandoned. This application May 3, 1976, Ser. No. 682,885

Int. Cl.² C25D 3/56; C23C 3/00, 3/02

U.S. Cl. 204—43 T 13 Claims

7. A plating bath for the deposition on aluminum and alumi-

num alloy surfaces of metals selected from the group of nickel-lead, cobalt-lead and combinations thereof, comprising an aqueous bath containing the dissolved salts of the plating metals and buffering salts, wherein

the pH of said bath is maintained in the range of from pH 7 to about pH 12 by the addition of a base selected from the group consisting of alkali metal hydroxides and ammonium hydroxide, and

from about 0.005% by weight to about 1.0% by weight of a lead salt based on the total plating bath composition is added thereto,

whereby the resultant plating on the aluminum and aluminum alloy surfaces is deposited in the form of small, finely divided sponge-like particles not exceeding 100 microinches in diameter.

4,028,201

ELECTROLYTIC MONOCARBOXYLATION OF ACTIVATED OLEFINS

Donald Armon Tyssee, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Nov. 13, 1972, Ser. No. 306,227
Int. Cl.² C25B *3/00*
U.S. Cl. 204—72 **13 Claims**

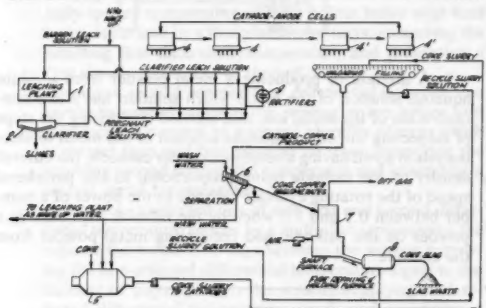
1. The method of electrolytic carboxylation of alpha,beta-olefinic nitriles, esters and amides which comprises electrically reducing such olefinic compounds at the cathode, in an electrolysis medium comprising solvent and supporting electrolyte and in the presence of carbon dioxide and a small amount of water sufficient to direct the carboxylation substantially toward mono-carboxylation and recovering a product in which mono-carboxylation of the said olefinic compound has occurred.

4,028,202

DIRECT ELECTROCHEMICAL RECOVERY OF COPPER FROM DILUTE AMMONIACAL SOLUTIONS

Paul R. Ammann, Boxford; Glenn M. Cook, Harvard, and Charles Portal, Newton, all of Mass., assignors to Kennecott Copper Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 596,458, July 16, 1975. This application Oct. 28, 1975, Ser. No. 626,114
Int. Cl.² C25C *1/12*
U.S. Cl. 204—106 **17 Claims**



1. A process for recovering copper from an ammoniacal copper solution containing about 0.1 to 20 gpl copper, 4 to 60 gpl NH_4^+ and 2 to 30 gpl NH_3 and having a pH of 8 to 10, which comprises

a. introducing said solution into an electrolysis cell with a porous cathode material having a surface area of 2 to 1000 cm^3/cm^3 and an anode,

b. applying a voltage of 1 to 10 volts across said cell such that the current density in said cathode is from about 1 to 100 ASF,

c. flowing said solution through said cathode and by said anode at a rate to permit substantially complete reaction of the desired copper solute whereby copper is deposited in an on said cathode and a barren leach solution containing about 0.01 to 1.0 gpl copper is withdrawn, and

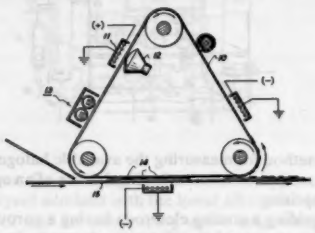
d. recovering deposited copper from said cathode.

4,028,203

PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIAL

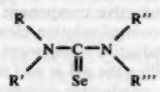
Joseph Y. C. Chu, Fairport, and W. H. H. Gunther, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 454,896, March 26, 1974. This application Jan. 15, 1976, Ser. No. 649,450
Int. Cl.² B01J *1/10*
U.S. Cl. 204—158 R **1 Claim**



1. A process for preparation of a solid phase dispersion of inorganic photoconductive materials in an insulating polymeric matrix comprising:

a. forming a polymeric composition from a film forming insulating polymeric resin and at least one organoselenium compound of the formula



wherein R, R', R'' and R''' are independently selected from hydrogen, alkyl, of 1 to 10 carbon atoms, phenyl, substituted phenyl, benzyl and substituted benzyl; and 'b. subjecting said polymeric composition to sufficient energy to decompose said organoselenium compound whereby elemental selenium is deposited within the organic polymeric composition in substantial conformity with the distribution of said energy throughout the composition.

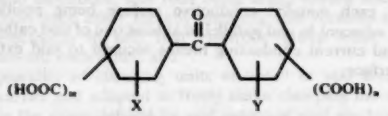
4,028,204

PHOTOPOLYMERIZABLE COMPOUNDS AND COMPOSITIONS COMPRISING THE PRODUCT OF THE REACTION OF A RESIN AND A POLYCARBOXY-SUBSTITUTED BENZOPHENONE

George Rosen, Wayne; Daniel J. Carlick, Livingston, and Ralph H. Reiter, Wayne, all of N.J., assignors to Sun Chemical Corporation, New York, N.Y.

Division of Ser. No. 405,516, Oct. 11, 1973, Pat. No. 3,926,639, which is a continuation-in-part of Ser. No. 200,174, Nov. 18, 1971, abandoned. This application May 12, 1975, Ser. No. 576,546
Int. Cl.² C08F *8/00*; **C08G** *19/00*
U.S. Cl. 204—159.14 **8 Claims**

1. A photopolymerizable compound comprising the product of the reaction of (1) a resin selected from the group consisting of polyamide, polyester oil-modified polyester, polyether, epoxy, phenolic, and polyurethane resins and (2) a polycarboxy-substituted benzophenone having the formula



wherein *m* and *n* is each an integer from 0 to 3 and the sum of *m* plus *n* is in the range of 2 to 6; and X and Y is each 1 and 4 halogen atoms or dialkylamino groups having 1 to 4 carbon atoms; X and Y may be the same or different and either or both may be omitted.

4,028,205

SURFACE TREATMENT OF ALUMINUM

Geoffrey A. Dorsey, Jr., Danville, Calif., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed Sept. 29, 1975, Ser. No. 617,550
Int. Cl.² C23F *7/06*; C09K *13/02*; C25D *13/00*
U.S. Cl. 204—181 **13 Claims**

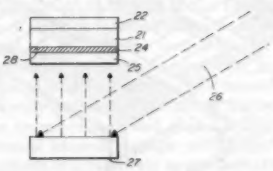
1. A method of forming a hydrophilic oxide coating on an aluminum surface which facilitates the bonding thereto of curable organic matter comprising treating the aluminum surface with an aqueous alkaline solution consisting essentially of caustic alkali, a surfactant and the balance water, with the interfacial temperature between the aluminum surface and the treating solution ranging from about 50° C to the boiling point of the solution, the pH of the solution controlled by caustic alkali to more than 8 but less than 10 and the surfactant retarding the etching of the solution so as to effect the formation of the desired oxide coating which facilitates the bonding of the curable organic matter.

4,028,206

METHOD FOR COOL DEPOSITION OF LAYERS OF MATERIALS ONTO A SUBSTRATE

William James King, 9 Putnam Road, Reading, Mass. 01867

Filed Mar. 10, 1976, Ser. No. 665,857
Int. Cl.² C23C *15/00*
U.S. Cl. 204—192 C **6 Claims**



1. In deposition processes wherein at least one layer is deposited upon thermally degradable substrates including plastic substrates in such a way that substantial degradation including deformation, melting, delamination or surface hazing of the substrate is caused by radiant heat transmission in the absence of a reflective material, the method of reducing radiant heating of the substrate which comprises depositing upon said substrate a reflective material which reflects a significant fraction of the thermal radiation incident upon said substrate during the deposition process and subsequently depositing upon said substrate said layer at a rate which is less than that which will cause degradation of the substrate but which is at least as great as that which would have caused degradation of the substrate in the absence of said reflective material.

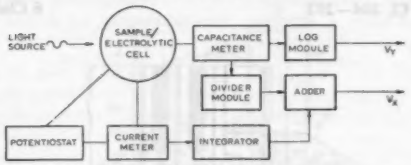
5. A method according to claim **1** wherein said deposition process includes the step of bombarding a target with an ion beam so as to cause sputtering of the target material which is then deposited on the substrate.

4,028,207

MEASURING ARRANGEMENTS

Marc Marian Faktor, Bushey Heath; Thomas Ambridge, Harrow Weald, and Ean Grant Bremner, Stanmore, all of England, assignors to The Post Office, London, England

Filed May 16, 1975, Ser. No. 578,144
Int. Cl.² G01N *27/46*; B23P *1/00*
U.S. Cl. 204—195 R **5 Claims**



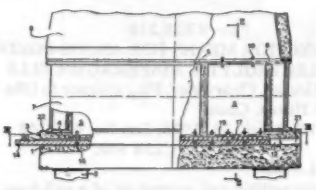
1. Apparatus for determining the carrier concentration as a function of depth in a semiconductor material by measuring the capacitance of a Schottky diode depletion layer formed in the semiconductor, said apparatus comprising an electrolytic cell arranged to contain electrolyte, means for mounting the semiconductor material in the cell so that a surface of the semiconductor can contact the electrolyte, the junction of said semiconductor and electrolyte forming said Schottky diode and said electrolyte in use progressively etching the surface area of the semiconductor material, masking means defining an area of the semiconductor material in contact with the electrolyte, electrical contact means for contacting the semiconductor, means for applying a d.c. voltage to said electrical contact means, electrode means for applying a d.c. voltage to said electrolyte, means for measuring the d.c. current through the electrolyte, means for applying an a.c. voltage to said Schottky diode, and a capacitance measuring unit responsive to said a.c. voltage for measuring the capacitance of the depletion layer of the Schottky diode.

4,028,208

ELECTROLYTE CELL WITH VERTICAL ELECTRODES

Umberto Giacopelli, Rosignano-Solvay (Leghorn), Italy, assignor to Solvay & Cie, Belgium

Filed Nov. 18, 1975, Ser. No. 633,104
Claims priority, application France, Dec. 16, 1974, 74.41708
Int. Cl.² B01K *3/10*
U.S. Cl. 204—252 **22 Claims**

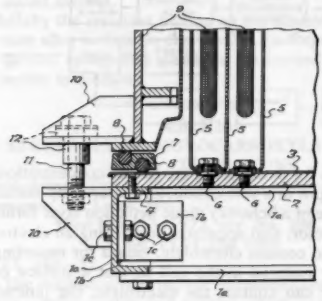


1. Electrolytic cell comprising, a baseplate with slots passing therethrough, anode plates which pass through the slots in the baseplate, sealing joints in the slots of the base plate, between the anode plates and the faces of the slots, a current lead-in disposed beneath the base plate and electrically and mechanically connected to the anode plates in order to support said anode plates, and means for supporting said current lead-in beneath the cell, and said sealing joints being supported on said current lead-in and compressed between said current lead-in and the faces of said slots in the base plate.

4,028,209
ELECTROLYSIS CELL

Pierre Labedan, Crepieux La Pape; Robert Mugnier, and Hubert Chavanel, both of Lyon, all of France, assignors to Rhone-Poulenc, Paris, France

Continuation-in-part of Ser. No. 221,746, Jan. 28, 1972, abandoned. This application Sept. 24, 1976, Ser. No. 726,220
Claims priority, application France, Feb. 2, 1971, 71.04345
Int. Cl.² C25B 1/26, 9/00
U.S. Cl. 204—252 **6 Claims**



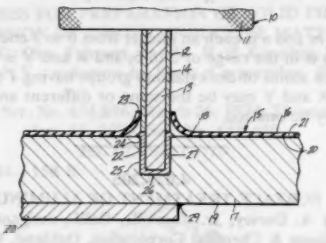
1. A cell of the diaphragm type for the electrolysis of aqueous solutions of alkali metal halides comprising an anodic bottom, an anode assembly and a cathode assembly, said anodic bottom comprising a profile frame having an upper face forming the bottom of the cell, a support plate for the anodes located on the upper face of the frame and covering the said face, and a foil of corrosion-resistant and electrically-conductive metal sleeving the support plate, and characterized in that a multiple-component, hydraulic and electrically insulating gasket assembly is placed between the cathode assembly and the foil of corrosion-resistant and electrically-conductive metal, over the periphery of the said foil, said multiple-component, hydraulic and electrically insulating gasket assembly comprising a non-deformable part having an upper face ad a lower face, each of the faces being provided with at least one groove in which is placed a non-permanently deformable flexible gasket, each of which protrudes above the face of said non-deformable part, said grooves being staggered opposite each other so that said non-deformable part rests on said foil of corrosion resistant, electrically-conductive metal, the non-deformable part and the non-permanently deformable flexible gaskets consisting of a corrosion-resistant material and which is also electrically insulating.

4,028,210
CONNECTION MEANS FOR ANODE POSTS IN ELECTROLYTIC DIAPHRAGM CELLS

Morton S. Kircher, Clearwater, Fla., assignor to Olin Corporation, New Haven, Conn.

Filed Nov. 28, 1975, Ser. No. 636,242
Int. Cl.² C25B 9/00
U.S. Cl. 204—266 **8 Claims**

1. In an electrolytic cell comprised of a cell base having:
- a. a non-metallic interior layer which provides an interior surface,
- b. a metal conducting layer which provides an exterior surface
- c. an interface between the bottom of said interior layer and the top of said conducting layer,
- d. a cell body secured to said cell base,
  - 1. a plurality of diaphragm-coated cathodes secured to said cell body,
- e. a plurality of anodes, each anode comprising
  - 1. a metallic conductive surface secured to,
  - 2. an anode post, said anode post being secured to said cell base,
  - 3. each metallic conductive surface being positioned adjacent to and parallel to at least one of said cathodes,
- f. and current conducting means secured to said exterior surface,

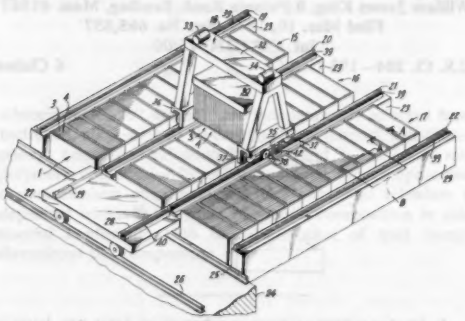


characterized by the improvement which comprises in combination,
- g. soldered connections between each of said anode posts and said cell base in a separate opening for each of said anode posts, and
- h. liquid-tight sealing means between said interior layer and each of said anode posts.

4,028,211
APPARATUS FOR AUTOMATICALLY REPLACING ELECTRODES USED FOR ELECTROLYTIC REFINING OF METAL

Seishiro Hirakawa; Shyuji Kanai; Matsuo Ikeda, and Toshinori Hirata, all of Gifu, Japan, assignors to Mitsui Mining & Smelting Co., Ltd., Tokyo, Japan

Filed May 17, 1976, Ser. No. 686,747
Claims priority, application Japan, Feb. 10, 1976, 51-13404
Int. Cl.² C25C 1/12, 1/18, 7/00, 7/06
U.S. Cl. 204—267 **8 Claims**



1. An apparatus for automatically replacing electrodes used for the electrolytic refining of metal comprising:

a group of electrolytic cells arranged in series and having a plurality of first electrodes and a plurality of second electrodes disposed alternately therein, each said electrode in said first electrode group being provided with a pair of horizontal recesses on opposite side edges of the upper end thereof and a central cutout formed between said recesses to terminate in a bottom level lower than the level of the upper end of the electrodes of said second electrode group disposed alternately with those of said first electrode group;

an electrode handling device adapted for travelling movement along rails laid in parallel on opposite sides of said electrolytic cell group;

an electrode carrier mounted in said electrode handling device for vertical movement;

a pair of parallel rods mounted to said electrode carrier to

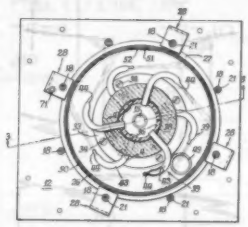
extend horizontally normal to the disposed direction of said electrodes, said rods being urged toward and away from each other thereby engaging said recesses of said electrodes in said first electrode group when urged toward each other; and

a plurality of clamping units mounted to said electrode carrier and adapted to freely make clamping movement in the space defined by said cutout of said electrodes in said second electrode group, thereby clamping said electrodes in said second electrode group at opposite sides of the upper central part thereof.

4,028,212
SILVER RECOVERY APPARATUS

Woodrow L. Bowen, 175 W. Oakton St., Des Plaines, Ill. 60018, and Harlan D. Moore, 809 Meadow Lane, Barrington, Ill. 60010

Filed June 14, 1976, Ser. No. 695,515
Int. Cl.² C25C *1/20, 7/00*
U.S. Cl. 204—272 **8 Claims**

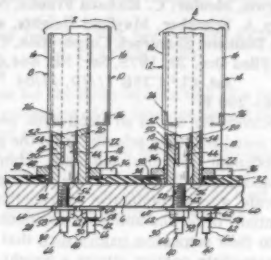


1. A silver recovery apparatus comprising an electrolytic chamber having a generally liquid tight cylindrical shape disposed with its axis in a generally vertical position, said chamber having a fixed plastic bottom and a removable plastic top, an anode of a relatively small diameter cylindrical shape fixedly disposed on the general vertical center axis of and within the cylindrical electrolytic chamber, a plastic tube sealingly affixed around its circumference to said bottom and extending upwardly within said cylindrical anode, said plastic tube closed at its upper end, said closed ended plastic tube defining a vertical central passage within said electrolytic chamber, a cathode of a relatively larger diameter cylindrical shape arranged and constructed in a concentric position with and spaced outwardly from the center anode and defining the outer extent of the cylindrical electrolytic chamber, an inlet passage in the electrolytic chamber for silver contaminated hypo solution, said inlet passage communicating with the central passage in the closed ended plastic tube, a plurality of spaced apart jet tubes affixed in a generally radial position in the walls of said plastic tube, said jet tubes having their inner ends in liquid communication with the central passage in the plastic tube and their outer ends passing through the walls of the anode and extending into the space between the anode and the cathode, the outer end of each jet tube bent at substantially right angles in the same direction so that hypo solution delivered to the inlet passage will flow into the central passage within the plastic tube, thence outwardly through the jet tubes, and thence in a circular path in the concentric space around the anode and within the cathode, whereby silver freed from the hypo solution is deposited on the inner surface of the cathode to thus rejuvenate the hypo solution, and a discharge passage communicating with the electrolytic chamber between the anode and the cathode.

4,028,213
VARIABLE GAP ANODE ASSEMBLY FOR ELECTROLYTIC CELLS

James M. Ford, Cleveland, Tenn., assignor to Olin Corporation, New Haven, Conn.

Filed Feb. 9, 1976, Ser. No. 656,166
Int. Cl.² C25B *11/00;* **C25C** *7/00*
U.S. Cl. 204—286 **10 Claims**



1. A multiple anode assembly for an electrolytic cell of the type including an anode mounting plate, at least one anode, and at least one foraminous cathode, said assembly comprising:

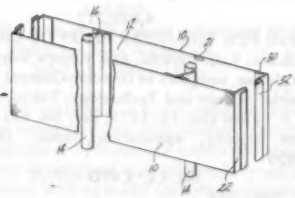
a. at least one mounting means for each of said anodes, said mounting means is a post, one end of said post being held in electrical contact with said anode mounting plate; and

b. attaching means for attaching at least some of said mounting means to said anode mounting plate so said anodes are maintained in a substantially perpendicular relationship thereto, said attaching means including a portion extending through said anode mounting plate and adapted for rotation therein for imparting lateral movement to said mounting means with respect to said anode mounting plate.

4,028,214
ADJUSTABLE ELECTRODE

James M. Ford, Cleveland, Tenn., and Elmer N. Macken, Baltimore, Md., assignors to Olin Corporation, New Haven, Conn.

Filed Jan. 28, 1976, Ser. No. 653,144
Int. Cl.² C25B *9/02, 1/03*
U.S. Cl. 204—286 **8 Claims**



1. An electrode suitable for use in a cell for the electrolysis of alkali metal chloride solutions which comprises:

a. two rectangular electrode surfaces positioned in parallel and having a space between said electrode surfaces,

b. at least two electrode posts positioned in said space between said electrode surfaces,

c. at least two resilient electrically conductive means each of said resilient electrically conductive means being attached to only one of said electrode posts and to only one of said electrode surfaces,

d. contractible means having means for attach- ment along two non-adjacent edges of each of said electrode sur-

faces, said contractible means being positioned outside of said space between said electrode surfaces, and

e. removable clamping means adapted to contact said contractible means.

4,028,215

MANGANESE DIOXIDE ELECTRODE

David L. Lewis, Mentor; C. Richard Franks, North Madison, and Barry A. Schenker, Mayfield Heights, all of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Dec. 29, 1975, Ser. No. 644,639

Int. Cl.² C25B *11/10, 11/04*

U.S. Cl. 204—290 F **12 Claims**

1. An electrode for use in an electrolytic process comprising: a valve metal substrate selected from the group of aluminum, molybdenum, niobium, tantalum, titanium, tungsten, zirconium and alloys thereof; on the surface of said valve metal substrate, a semi-conductive intermediate coating consisting essentially of tin and antimony compounds applied and converted to their respective oxides such that said semi-conductive intermediate coating attains a weight greater than 2 grams per square meter of said valve metal substrate surface area; and on the surface of said semi-conductive intermediate coating, a top coating consisting essentially of manganese dioxide such that said top coating attains a weight greater than 25 grams per square meter of said valve metal substrate surface area.

4,028,216

METHOD FOR PRODUCING AN ALUMINA SOL

Edward Michalko, Chicago, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed May 30, 1975, Ser. No. 582,524

Int. Cl.² B01J *13/00*; C01F *7/02*

U.S. Cl. 252—313 R **1 Claim**

1. A method of producing an alumina sol which comprises commingling a stoichiometric amount of aluminum with hydrochloric acid in an aqueous media to provide a final reaction mixture containing from about 10 to about 14 wt. % aluminum in from about a 1:1 to about a 1.5:1 ratio with the chloride anion content thereof, and treating the reaction mixture in the presence of from about 0.05 to about 0.5 wt. % cobalt chloride or nickel chloride based on the weight of said aluminum reactant at a reflux temperature of from about 98° C to about 115° C to effect substantially complete digestion of said aluminum.

4,028,217

METHOD FOR THE SEPARATION OF CHLOROPHYLL

Akira Okada; Keiji Iriyama, and Masaru Shiraki, all of Yokohama, Japan, assignors to Director-General of the Agency of Industrial Science and Technology, Tokyo, Japan

Filed Oct. 10, 1975, Ser. No. 621,516

Claims priority, application Japan, Oct. 14, 1974, 49-117850

Int. Cl.² C07D *487/22*

U.S. Cl. 260—314 **2 Claims**

1. A method for the separation of chlorophyll, characterized by adding to a given amount of a photosynthetizing living organism at least one organic solvent selected from the group consisting of methyl alcohol, acetone, methyl ethyl ketone and butylcarbitol in a weight amount of 3–8 times as much as said living organisms, triturating the mixture, removing insoluble matter from the liquid, admixing therewith dioxane in a volumetric amount of 1/5 – ⅛ of the volume of said organic solvent, adding to the liquid mixture an aqueous phosphate buffer solution having a pH of about 8 until said liquid mixture becomes turbid, allowing said mixture to stand in a cooled dark place and thereafter separating the precipitated crystalline chlorophyll.

4,028,218

DEFOAMING COMPOSITION AND METHOD OF DEFOAMING AQUEOUS SOLUTIONS OR DISPERSIONS

Hans-Ferdi Fink, Essen-Ruttenscheid; Herwig Fritsch, Gladbeck; Götz Koerner, Essen; Gerd Rossmy, Essen-Werden, and Günter Schmidt, Essen, all of Germany, assignors to Th. Goldschmidt AG, Essen, Germany

Filed Oct. 18, 1974, Ser. No. 515,847

Int. Cl.² B01D *19/04*

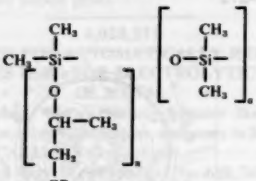
U.S. Cl. 252—321 **13 Claims**

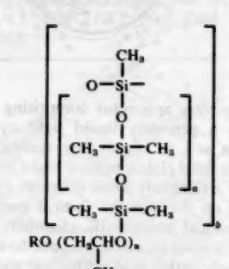
1. In a method for preventing the formation of foam and destroying existing foam in an aqueous solution or dispersion wherein an effective amount of defoaming composition composed of an oil, highly dispersed silica and a defoaming substance of a polyoxyalkylene-polysiloxane block copolymer is used, the improvement which comprises said block copolymer consisting essentially of

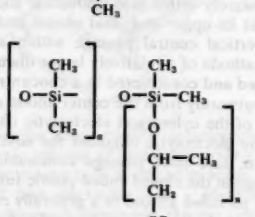
a. about 10 to 60 % by weight of methylpolysiloxane and

b. with the balance polyoxyalkylene, said polyoxyalkylene block consisting of oxypropylene units and said block copolymer having the formula:

Formula I







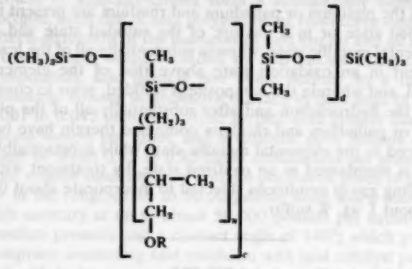
wherein

R is alkyl, acyl, aryl or R′—NH—CO—, wherein R′ stands for aryl or alkyl,

a and *n* have finite values and the absolute values for *n*, *a* and *b* are the corollary of conditions (a) and (b); or the formula

Formula II

-continued



wherein R is alkyl, acyl, aryl or R'—NH—CO—, wherein R' is alkyl or aryl,

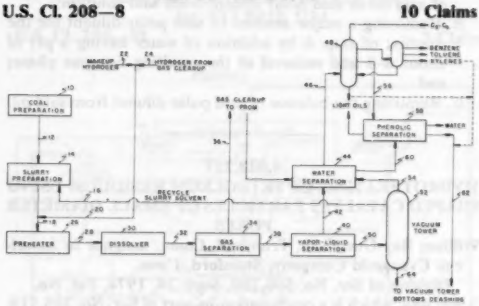
c ≧ 1, and the absolute values for n, c, and d are the corollary of conditions (a) and (b).

4,028,219

PROCESS FOR THE PRODUCTION OF DEASHED COAL LIQUIFACTION PRODUCTS

Roger Allen Baldwin, and Robert Elliott Davis, both of Oklahoma City, Okla., assignors to Kerr-McGee Corporation, Oklahoma City, Okla.

Filed Oct. 23, 1975, Ser. No. 625,206
Int. Cl.² C10G *1/04*
U.S. Cl. 208—8 **10 Claims**



1. In a process which comrises preparing coal liquefaction products by contracting coal with coal dissolving solvent at elevated temperature and pressure in a hydrogen atmosphere, passing the resulting mixture to a vaccum tower to remove coal dissolving solvent for recirculation and leave still bottoms substantially free of such coal dissolving solvent, the improvements which comprise contacting said vacuum tower still bottoms, which are substantially free of coal dissolving solvent, with a solubilizing solvent to dissolve a substantial quantity of said still bottoms and separating said dissolved still bottoms from undissolved still bottoms.

4,028,220

GAS EXTRACTION OF COAL

Donald Bremner Urquhart, Charlton Kings, England, assignor to Coal Industry (Patents) Limited, London, England

Filed Oct. 15, 1975, Ser. No. 622,737
Claims priority, application United Kingdom, Nov. 19, 1974, 50122/74
Int. Cl.² C10G *1/04*
U.S. Cl. 208—8 **8 Claims**

1. A process for the hydrogenative extraction of coal characterized by the combination of treating coal with water and carbon monoxide at a temperature within the range 300° C to 380° C in an initial hydrogenation step, separating the gases from the treated coal at the end of the treatment, extracting the treated coal with an extractant in the gas phase under supercritical conditions at a temperature of at least 400° C, separating the solid residue from the gas phase and recovering the coal extract from the extractant.

4,028,221

LIQUEFACTION OF SUB-BITUMINOUS AND LIGNITIC COAL

Morgan C. Sze, Upper Montclair, and George J. Snell, Fords, both of N.J., assignors to The Lummus Company, Bloomfield, N.J.

Filed June 6, 1975, Ser. No. 584,627
Int. Cl.² C10G *1/06*
U.S. Cl. 208—8 **12 Claims**

1. In a process for the hydroliquefaction of a coal selected from the group consisting of sub-bituminous and lignitic coals, the improvement comprising:

employing as a pasting solvent for said hydroliquefaction, a liquid fraction produced by the hydroliquefaction of said coal, said liquid fraction containing at least 25 weight percent of components boiling above 800° F.

4,028,222

METHOD FOR EXTRACTING OIL FROM OIL SHALE

Phillip Earl Prull, 2100 Lewelling Blvd. No. 10, San Leandro, Calif. 94579

Filed Feb. 23, 1976, Ser. No. 660,060
Int. Cl.² C10G *1/04*
U.S. Cl. 208—11 R **9 Claims**

1. A process for extraction of oil from oil shale comprising crushing said oil shale;

classifying said crushed oil shale by particle size into at least two portions of differing range of particle size;

heating said oil shale to a temperature sufficient to release oil therefrom and below the flash point of the oil released therefrom; and

separately centrifuging each of said portions to remove liquid oil therefrom at a centrifuge speed and for a length of time selected for maximal efficiency of oil separation from said portion per unit of driving energy input to said centrifuge.

4,028,223

GUARD BEDS IN HYDROCARBON CONVERSION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

John C. Hayes, Palatine, and Ernest L. Pollitzer, Skokie, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 522,209, Nov. 8, 1974, Pat. No. 3,960,710. This application Aug. 11, 1975, Ser. No. 603,839
The portion of the term of this patent subsequent to June 1, 1993, has been disclaimed.
Int. Cl.² C10G *35/08*
U.S. Cl. 208—91 **18 Claims**

1. A process for converting a hydrocarbon charge stock which comprises contacting the hydrocarbon charge stock and a hydrogen stream at hydrocarbon conversion conditions, in a reaction zone maintained in a substantially sulfur- and water-free condition, with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.5 to about 5 wt. % cobalt, about 0.01 to about 5 wt. % tin, and about 0.1 to about 3.5 wt. % halogen, wherein the platinum group metal, catalytically available cobalt, and tin are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum group metal is present in the elemental metallic state, wherein substantially all of the tin is present in an oxidation state above that of the elemental metal wherein the average crystalline size of said tin is less than 100 Angstroms in maximum dimension, and wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is

reducible to the elemental metallic under hydrocarbon conversion conditions or in a mixture of these states.

4,028,224

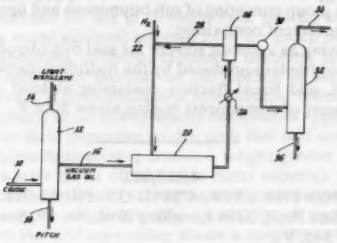
PROCESS FOR THE PREPARATION OF LOW POUR POINT LUBRICATING OILS

John M. MacDonald, Sarnia, and Robert Kartzmark, Mississauga, both of Canada, assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation of Ser. No. 317,608, Dec. 22, 1972, abandoned. This application Dec. 17, 1975, Ser. No. 641,351

Int. Cl.² C10G *13/00*

U.S. Cl. 208—92 **11 Claims**



1. A process for the preparation of low pour point lubricating oils from heavy naphthenic Cold Lake crude oil feedstocks without the need for solvent extracting and dewaxing procedures which process consists essentially of the sequential steps of:

i. vacuum distilling, in a distillation zone, a heavy naphthenic crude oil feedstock containing from about 2 to 10 weight % of sulfur based on the weight of the feedstock, said feedstock exhibiting a specific gravity ranging from about 5° to 20° API to obtain at least one distillate cut exhibiting a boiling range of from about 500° to 1000° F and a specific gravity ranging from about 10° to 25° API;

ii. passing said distillate cut from said distillation zone directly to at least one hydrocracking zone wherein said distillate cut is contacted with a hydrocracking catalyst at a temperature from about 650° to 850° F, a hydrogen partial pressure of about 500 to 5000 psig and a space velocity of from about 0.1 to 2.0 V/V/Hr;

iii. removing the low boiling light ends from the hydrocrackate; and

iv. recovering a low pour point lubricating oil.

4,028,225

HYDROCARBON CONVERSION WITH A SULFIDED ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

Frederick C. Wilhelm, Ann Arbor, Mich., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 479,231, June 13, 1974, Pat. No. 3,915,846, which is a continuation-in-part of Ser. No. 353,925, April 23, 1973, Pat. No. 3,839,195, which is a continuation-in-part of Ser. No. 152,467, May 28, 1971, abandoned, which is a division of Ser. No. 835,218, June 20, 1969, abandoned. This application Sept. 8, 1975, Ser. No. 611,582

Int. Cl.² B01J *23/62;* **C10G** *35/08*

U.S. Cl. 208—139 **16 Claims**

1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion conditions with a sulfided acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % rhodium, about 0.1 to about 3.5 wt. % halogen, about 0.01 to about 1 wt. % sulfur, and lead in an amount sufficient to result in an atomic ratio of lead to platinum or palladium of about 0.05:1 to about 0.9:1, wherein the platinum or palladium, rhodium and lead are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum or palladium and rhodium are present in a sulfided state or in a mixture of the sulfided state and the elemental metallic state, wherein substantially all of the lead is present in an oxidation state above that of the elemental metal, and wherein the composite is sulfided, prior to contact with the hydrocarbon and after substantially all of the platinum or palladium and rhodium contained therein have been reduced to the elemental metallic state while substantially all lead is maintained in an oxidized state, by treatment with a sulfiding gas at conditions selected to incorporate about 0.01 to about 1 wt. % sulfur.

4,028,226

METHOD OF REREFINING OIL WITH RECOVERY OF USEFUL ORGANIC ADDITIVES

John Wesley Forsberg, Mentor-On-The-Lake, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio

Filed Nov. 12, 1975, Ser. No. 631,360

Int. Cl.² C10M *11/00*

U.S. Cl. 208—180 **9 Claims**

1. A method of recovering oil of lubricating viscosity from used oil of lubricating viscosity which comprises the steps of:

A. Diluting said used oil with a water-soluble polar diluent in which said used oil is substantially soluble, said diluent comprising a lower alkanol or lower alkanone, and removing impurities insoluble in the soluble in the solution of said oil in said polar diluent from said solution;

B. Removing a major amount of said polar diluent for the solution of step A by addition of water having a pH of about 6–8 **and removal of the resulting aqueous phase; and**

C. Removing the balance of said polar diluent from said oil.

4,028,227

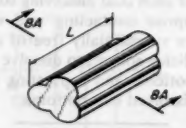
HYDROTREATING OF PETROLEUM RESIDUUM USING SHAPED CATALYST PARTICLES OF SMALL DIAMETER PORES

William Roy Gustafson, Trumbull, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 508,780, Sept. 24, 1974, Pat. No. 3,966,644, which is a continuation-in-part of Ser. No. 385,519, Aug. 3, 1973, abandoned, which is a continuation-in-part of Ser. No. 255,491, May 22, 1972, abandoned. This application Apr. 5, 1976, Ser. No. 673,839

Int. Cl.² C10G *23/02*

U.S. Cl. 208—216 **7 Claims**



1. A process for hydrotreating a petroleum residuum with a porous hydrotreating catalyst particle to obtain a desulfurized product, said particle having a composition of a major portion of alumina; up to about 36 weight percent of silica, based on the total weight of silica and alumina; from about 10 to 25 weight percent of molybdenum in the form of its oxide or sulfide; and a total of about 1 to 8 weight percent of a metal selected from cobalt, nickel, and mixtures thereof in the form of the corresponding oxide or sulfide, said percentages being based on the total weight of said catalyst particle; said particle being further characterized by a polylobal cross-sectional shape defining a concave geometric solid, said cross-sectional shape being defined by circles, all of said circles being spaced from one another by a distance which is from three-eighths to about fifteen-sixteenths of the diameters of said circles and

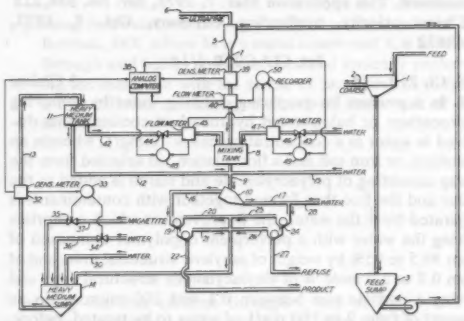
when more than two lobes are present, lines connecting the centers of adjacent circles form a substantially equilateral polygon, each side of said polygon being from three-eighths to fifteen-sixteenths of the diameter of said circles and all of said cross-sectional shape included by said circles being of said composition; said particle size being defined by a ratio of geometric volume to geometric surface in the range of about 0.001 to 0.042 inch; a catalytic surface area greater than 150 square meters per gram; and a catalytic pore volume in the range of about 0.35 to 0.85 cubic centimeters per gram, said pore volume resulting from a major portion of pores of diameter in the range of 40 to 90 Angstrom units when measured with mercury at up to about 50,000 pounds per square inch absolute pressure and a contact angle of 140°; which process comprises contacting said residuum with said catalyst particle and with hydrogen at a flow rate of about 500 to 5,000 standard cubic feed per barrel of oil at a liquid hourly space velocity of about 0.20 to 5.0 reciprocal hour, a temperature in the range of about 600° to 850° F., and a total pressure in the range of about 200 to 10,000 pounds per square inch guage.

4,028,228

PROCESS AND APPARATUS FOR CLEANING VERY FINE ORE

David D. Ferris, and Kenneth E. Harrison, both of Pittsburgh, Pa., assignors to Heyl & Patterson, Inc., Pittsburgh, Pa.

Filed Feb. 2, 1976, Ser. No. 654,230
Int. Cl.² B03B *5/34*
U.S. Cl. 209—39 **3 Claims**



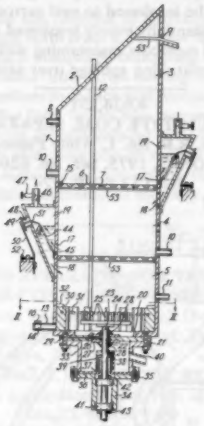
1. Coal cleaning apparatus comprising a classifying cyclone having an inlet and an overflow outlet for ultrafine coal particles and an underflow outlet, means for continually delivering a stream of coal and water to the inlet of the cyclone, a heavy medium cyclone having an inlet and an overflow outlet and an underflow outlet, conduit means connecting the underflow outlet of the classifying cyclone with the inlet of the heavy medium cyclone and including a receptacle through which underflow from the classifying cyclone flows, means containing a supply of heavy medium formed from a suspension of magnetizable particles and water, means for continually delivering heavy medium from said containing means to the underflow in said conduit means, means for continually delivering water to the underflow in said conduit means, means for delivering to said receptacle additional heavy medium from said containing means and the required amount of water to maintain a substantially constant specific gravity and flow rate at the inlet of the heavy medium cyclone, magnetic separating means for receiving overflow from the heavy medium cyclone and having an outlet for separated heavy medium and an outlet for coal, magnetic separating means for receiving underflow from the heavy medium cyclone and having an outlet for separated heavy medium and an outlet for rejects, and means for conducting said separated heavy medium from the magnetic separating means back to said containing means.

4,028,229

FROTH FLOTATION

Christopher Cambridge Dell, Leeds, England, assignor to National Research Development Corporation, London, England

Filed Mar. 14, 1975, Ser. No. 558,499
Claims priority, application United Kingdom, Mar. 22, 1974, 12857/74; Jan. 17, 1975, 02128/75
Int. Cl.² B03D *1/22*
U.S. Cl. 209—164 **21 Claims**



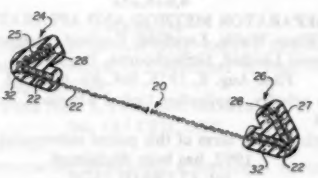
1. Apparatus for use in froth flotation which comprises:
a receptacle;
means for generation of bubbles in said receptacle;
means for dividing said receptacle to provide two or more flotation cells arranged one above another;
apertured passage means in said dividing means for the passage of froth upwardly through said dividing means from each lower cell into the adjacent upper cell; and
control means for each lower cell, said means being responsive to changes in the thickness of the froth layer in said lower cell and serving to maintain said thickness at a predetermined value.

4,028,230

VIBRATORY SEPARATOR SCREEN AND METHOD OF MANUFACTURE

Jesse Rosenblum, 112 Roosevelt St., Closter, N.J. 07624

Filed Apr. 2, 1975, Ser. No. 564,446
Int. Cl.² B07B *1/48*
U.S. Cl. 209—403 **17 Claims**



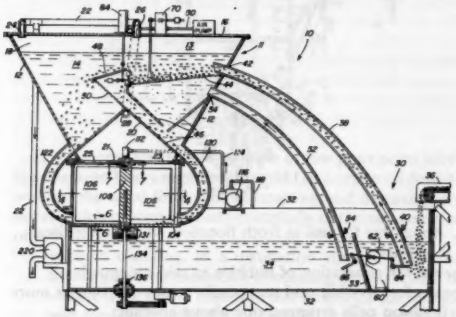
1. In a vibratory separator screen in which a wire mesh has at least a first pair of opposed wire mesh edges having a corresponding first pair of opposed end portions at said wire mesh edges each comprising a reinforced edge strip capable of being tensioned to a surrounding frame, the improvement comprising a reinforcing spline member located adjacent each of said opposed end portions of said first pair and being substantially equal in longitudinal extent thereto and a mold cured encapsulating medium at each of said opposed end

portions of said first pair completely surrounding said spline member and said adjacent first pair opposed end portion for forming a reinforced molded member at each of said opposed end portions, said spline member being fixedly secured to said adjacent opposed end portion in said molded member with said mesh at a desired tautness for providing a substantially evenly tensioned mesh when tensioned to said surrounding frame, said completely encapsulated molded member comprising said reinforced edge strip, said reinforced edge strip having sealed end points and comprising means for enabling said wire mesh to be tensioned to said surrounding frame for providing said substantially evenly tensioned mesh, said spline reinforced molded members maintaining stiffness of said wire mesh edges and controlling spillage over said edges.

4,028,231
VACUUM TYPE COAL SEPARATOR

Harold D. Parham, R.R. No. 1, White Plains, Ky. 42464

Filed Oct. 8, 1975, Ser. No. 620,831
Int. Cl.² B03B 5/24
U.S. Cl. 209—457 **14 Claims**



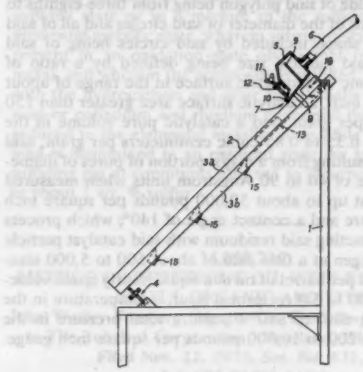
1. A coal and rock separator using water and vacuum comprising: means for separating undesired particles from desired particles including; a main separator hopper for holding water and having two separate compartments therein, one for receiving rock, and the other for receiving coal; a vacuum source connected to the top portion of the separator hopper for maintaining a vacuum in the hopper; input means to allow water and a coal-rock mix to be fed into the separator hopper; a permeable support means mounted in the hopper for receiving said coal-rock mix; means for introducing a pulsating flow upwardly through the support; means for dividing the material stratified thereby into two fractions; and discharge means at the bottom of the main separator hopper to prevent reverse water/airflow into the hopper while permitting separate discharge of the coal and rock as separated therein.

4,028,232
SEPARATOR METHOD AND APPARATUS

James William Wallis, Larefield, England, assignor to Wallis Separators Limited, Sittingbourne, England

Filed Aug. 8, 1975, Ser. No. 603,092
Claims priority, application United Kingdom, Aug. 9, 1974, 35290/74
The portion of the term of this patent subsequent to Feb. 4, 1992, has been disclaimed.
Int. Cl.² B01D 35/20
U.S. Cl. 210—19 **7 Claims**

1. A separator for effecting separation of solid materials from liquids which comprises a filter screen, said filter screen being so arranged that in operation liquid passes through said filter screen and solid materials are retained on and travel along said filter screen in a first direction, generator means for subjecting said filter screen to acoustic pressure waves, said generator means being arranged close to but not touching said filter screen so that in operation liquid passing through said filter screen couples acoustic pressure waves from said generator means to said filter screen, said generator means being an acoustic pressure wave transducer assembly that stretches at



least nearly the whole way across said filter screen in a second direction transverse to said first direction.

4,028,233
WATER PURIFICATION PROCESS

Karl-Ernst Quentin; Ludwig Weil, both of Munich, and Harald Berger, Kelkheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation-in-part of Ser. No. 403,020, Oct. 3, 1973, abandoned. This application Mar. 7, 1975, Ser. No. 556,222
Claims priority, application Germany, Oct. 5, 1972, 2248832
Int. Cl.² C02B 1/14
U.S. Cl. 210—28 **3 Claims**

1. In a process for preparing drinking water by removing hydrocarbon or halogenated hydrocarbon contaminants dissolved in water in a concentration below 10 mg/1, wherein an aluminum or iron salt and a flocculation aid selected from the group consisting of polyacrylamide and starch is added to the water and the floc thus formed together with contaminants is separated from the water, the improvement which comprises mixing the water with a pulverulent copolymer composed of from 99.5 to 95% by weight of ethylene structural units and of from 0.2 to 2.0 mole % of vinylacylamide structural units and having a particle size between 0.1 and 200 microns, in an amount of from 2 to 100 mg/1 of water to be treated, before, during or after the addition of the aluminum or iron salt, said copolymer being introduced together with said flocculation aid to the water, and separating said polymer substance together with said floc and contaminants from the water.

4,028,234
BUFFERING AGENTS

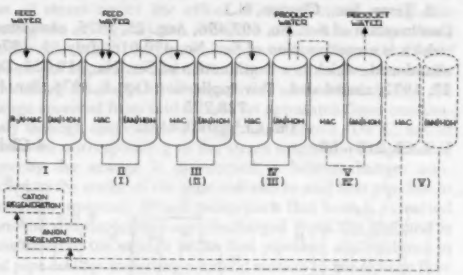
Arthur Katzakian, Jr., Sacramento, and David O. DePree, Loomis, both of Calif., assignors to Aerojet-General Corporation, El Monte, Calif.

Continuation-in-part of Ser. No. 476,966, June 6, 1974, abandoned. This application Sept. 18, 1975, Ser. No. 614,428
The portion of the term of this patent subsequent to Dec. 23, 1992, has been disclaimed.
Int. Cl.² B01D 15/04
U.S. Cl. 210—37 R **9 Claims**

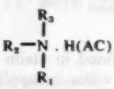
1. A process for demineralizing water comprising the steps of:

passing an amine buffer of the formula:

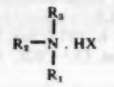
where R_1, R_2 and R_3 are selected from hydrogen, alkyl of 1 to 6 carbon atoms or hydroxyalkyl provided that the amine buffer contains at least two hydroxyl groups and at least two of the hydroxyl groups are separated from the



nitrogen atom by from 1 to 3 linear carbon atoms; through a bed of weakly acidic cation exchange resin in hydrogen form of the formula, H(AC) having a pK of from 5.0 to 7.5 to form a buffer amine salt bed of the cation resin of the formula:



passing feedwater containing dissolved mineral salts of the formula, MX, where M is a metal cation and X is an anion through said buffer amine salt bed and ionically exchanging the metal ion with the amine of the resin salt to form a first effluent containing a dissolved amine salt of the formula:



passing the first effluent through a bed of weakly basic anion exchange resin having a pK from 5.0 to 7.5 and depositing the anions, X, thereon to form a second effluent containing said amine buffer.

4,028,235

FROTH FLOTATION WITH SEWAGE TREATMENT PLANT WATER EFFLUENT

Gerald F. Fountain; Jaime Veloz; Edward A. Bilson, and John A. Cronin, all of Inspiration, Ariz., assignors to Inspiration Consolidated Copper Company, Morristown, N.J.

Filed June 4, 1976, Ser. No. 692,926

Int. Cl.² B03D *1/02*

U.S. Cl. 210—44 **5 Claims**

1. In the process of concentrating a sulfide mineral by froth flotation from an aqueous pulp of an ore containing such mineral, the improvement comprising using as at least part of the aqueous phase of the pulp sewage treatment plant water effluent conditioned prior to use with at least about 3 parts per million of a polyglycerol comprising, for each 100 parts by weight thereof, from about 55 parts to 80 parts by weight of a mixture of glycerol, diglycerol, triglycerol, tetraglycerol, and pentaglycerol, with the glycerol being present in an amount no greater than about 15 parts by weight.

4,028,236

RECOVERY OF MERCURY

Douglas W. Townsend, Port Credit, and H. Douglas Woods, Ottawa, both of Canada, assignors to Ontario Research Foundation, Sheridan Park, Canada

Filed Jan. 21, 1975, Ser. No. 542,853

Claims priority, application United Kingdom, Jan. 21, 1974, 2781/74

Int. Cl.² C22B *3/00*

U.S. Cl. 210—45 **9 Claims**

1. A method for the removal of mercury in metallic form and/or soluble ionic form from a aqueous medium containing such mercury which comprises contacting said aqueous medium with tin-coated iron strips having tin-iron interfaces exposed to the medium to reduce said mercury in soluble ionic form to the metallic form by the iron, accumulating said mercury in metallic form initially present in said aqueous medium and/or formed by said reduction of mercury in soluble ionic form on the tin surface, and separating the tin-coated iron strips having surface accumulated mercury.

4,028,237

METHOD AND APPARATUS FOR TREATMENT OF FLUORINE-CONTAINING WASTE WATERS

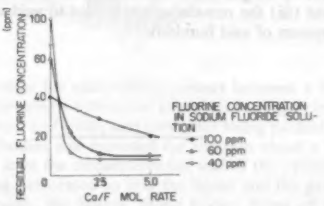
Shigeoki Nishimura; Toshio Sawa; Kouji Otani, all of Hitachi, and Seiichi Kikkawa, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 1, 1976, Ser. No. 662,615

Claims priority, application Japan, Feb. 28, 1975, 50-23950

Int. Cl.² C02B *1/20*

U.S. Cl. 210—45 **3 Claims**



1. A method for treating fluorine-containing waste waters to remove fluorine values therefrom, which comprises adding aluminum ions to fluorine-containing waste waters at pH 5 to 8 to convert a portion of said fluorine values to hydroxy-fluoride complexes, adding phosphate ions and calcium ions to the waste water at pH 6 to 8 to form fluoride apatite with the residual fluorine that has not been converted to said complexes, and removing said hydroxy-fluoride complexes and fluoride apatite from the treated water.

4,028,238

TREATMENT OF MUNICIPAL WASTE SLUDGES

John L. Allan, Glen Rock, N.J., assignor to Dart Industries Inc., Los Angeles, Calif.

Filed Nov. 3, 1975, Ser. No. 628,454

Int. Cl.² C02C *3/00*

U.S. Cl. 210—53 **6 Claims**

1. In a process for dewatering a municipal waste sludge, having a suspended solids content between about 1 and about 5 percent by weight, wherein said sludge is subjected to treatment with sufficient quantities of calcium oxide or hydroxide and from about 5 to about 5000 milligrams alum per liter of waste sludge to obtain a pH value in the range from about 10 to about 11, and a flocculating agent is added thereto in amounts of from about 1 to about 100 milligrams per liter of said waste sludge, whereby a flocculated sludge containing precipitated aluminum hydroxide is obtained, the improvement which comprises:

a. adding to the flocculated sludge from about 25 to 75% by

weight of calcium oxide or hydroxide based on the weight of suspended solids in the municipal waste sludge before said treatment, and

b. filtering the resultant mixture under a pressure of at least about 0.5 atmospheres to obtain a liquid filtrate and a solids filter cake.

4,028,239

PROCESS FOR PREVENTING LIME DEPOSITS IN A HUMIDIFIER

Christoph Zinsstag; Heinz Kutschera, both of Visp, and Dietrich Knutti, Rheinfelden, all of Switzerland, assignors to Lonza Ltd., Gampel, Valais, Switzerland

Continuation of Ser. No. 483,764, June 27, 1974, abandoned. This application Apr. 12, 1976, Ser. No. 676,207

Claims priority, application Switzerland, June 3, 1973, 9658/73

Int. Cl.² C02B *5/06*

U.S. Cl. 210—58 **4 Claims**

1. A process of preventing the formation of lime deposits in the water distribution system of a humidifier which comprises adding a tablet-form preparation consisting essentially of (i) 2 to 20 percent by weight of acetylsalicylic acid, (ii) 0.05 to 1 percent by weight of formaldehyde resin condensation product and (iii) the remainder citric acid to said water distribution system of said humidifier.

4,028,240

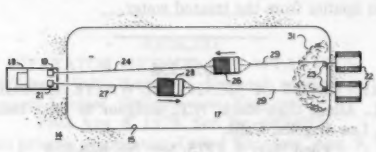
METHOD AND APPARATUS FOR TREATING SUMPS

Frank Manchak, Jr., 635 Grove Lane, Santa Barbara, Calif. 93105

Filed Oct. 15, 1973, Ser. No. 406,349

Int. Cl.² C02B *1/18*

U.S. Cl. 210—59 **2 Claims**



1. The method of treating oil field sumps to convert the contents into ecologically acceptable material comprising:

a. mixing in place in the sump calcium oxide with the sump contents in the range ½ to 5 percent by weight of calcium oxide to sump contents, adding oxide until the mixture stiffens;

b. resting the mixture up to 2 days;

c. removing the mixture from the sump;

d. spreading the mixture for drying up to 3 weeks; and

e. thereafter compacting the mixture,

the compacted mixture forming a self-sealing mass that does not appreciably bleed out sump constituents, nor are they appreciably leached out.

4,028,241

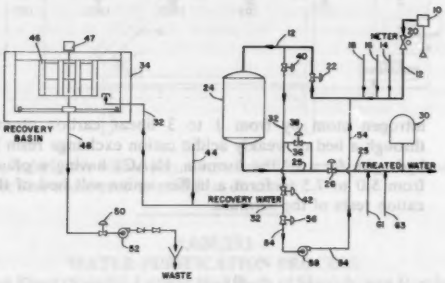
APPARATUS FOR AND METHOD OF RECOVERING WATER USED TO BACKWASH AND RINSE A FILTER

Raymond R. Davis, Pitman; Alfred M. Langberg, Sewell, and Alvin P. Debus, Pitman, all of N.J., assignors to Hungerford & Terry, Inc., Clayton, N.J.

Continuation of Ser. No. 607,496, Aug. 25, 1975, abandoned, which is a continuation of Ser. No. 490,016, July 19, 1974, abandoned, which is a continuation of Ser. No. 319,089, Dec. 27, 1972, abandoned. This application Oct. 1, 1976, Ser. No. 728,773

Int. Cl.² B01D *41/02*

U.S. Cl. 210—60 **4 Claims**



4. A process as defined in claim 3 in which, during the backwashing, purified water is supplied to the point of community use from the backwashing reservoir.

4,028,242

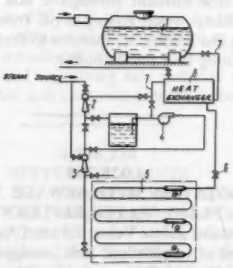
METHOD OF THERMAL DISINFECTION OF SEWAGE AND PLANT REALIZING SAME

Vyacheslav Alexandrovich Kokurin, Bolnichny proezd, 18, kv. 46, Pokrov Vladimirskoi oblasti; Igor Alexeevich Bakulov, Ryazansky prospekt, 82, korpus 2, kv. 79, and Vitaly Mikhailovich Kotlyarov, ulitsa Koshtoiantsa, 5, kv. 69, both of Moscow, all of U.S.S.R.

Filed Feb. 6, 1975, Ser. No. 547,881

Int. Cl.² C02C *1/00*

U.S. Cl. 210—71 **2 Claims**



1. A plant operable with a source of steam for thermal disinfection of sewage, which plant comprises: a tank for collecting sewage; a first pipeline connected to said tank at an outlet thereof; an intermittently operable jet apparatus having a nozzle coupled to said source of steam and connected by said first pipeline with said tank to inject sewage into the jet apparatus to preheat the sewage to a temperature not greater than 100° C; a pump having an inlet and an outlet; means connecting the inlet of said pump to the outlet of said first jet apparatus; a second pipeline connecting the first pipeline directly to the inlet of the pump; valve means in said second pipeline and in the means connecting the outlet of the jet

apparatus to the inlet of the pump for controlling the flow to the inlet of said pump; a second jet apparatus having a nozzle coupled to said outlet of the pump such that sewage is pumped through said second jet apparatus under pressure; said second jet apparatus being connected to said steam source for induction of steam under the effect of the pumped sewage for heating the sewage by the inducted steam to a temperature greater than 100° C.; a pipe coil connected to the outlet of said second jet apparatus and including further valve means for controlling discharge of sewage from said coil such that the sewage received from said second jet apparatus flows continuously through said coil at a temperature above 100° C. and at a pressure corresponding to the steam saturation temperature whereby the sewage is disinfected; a heat-exchanger connected to the outlet of the pipe coil and to said first pipeline at a location upstream of said pump such that heat is extracted from the disinfected sewage discharged from the coil and is transferred to the sewage in the first pipeline; and cyclones in said pipe coil for imparting a helical motion to the sewage flow therein.

4,028,243

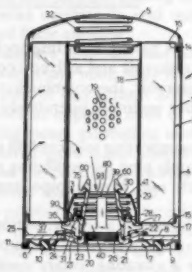
RELIEF VALVE FOR A FLUID FILTER ASSEMBLY

Robert J. Offer, Racine, Wis., and Bernard J. Van Vooren, Albert Lea, Minn., assignors to Tenneco Inc., Racine, Wis.

Filed May 28, 1976, Ser. No. 690,835

Int. Cl.² B01D *27/10*

U.S. Cl. 210—130 **3 Claims**



1. In a fluid treatment assembly having an outer shell closed at one end, a fluid treatment element, having a first end cap and a second end cap, within said shell, a treatment element hold down spring interposed between said closed end of said shell and said first end cap and a unit end cap assembly sealingly engaged with said open end of said shell, said hold down spring biasing said treatment element toward said unit end cap assembly, an improved treatment element by-pass valve comprising:

a valve housing formed of a spring retention means sealingly engaged with said second end cap, said valve housing having a closed end and an opened end, said closed end having a fluid flow opening for enabling fluid to flow from said treatment element into said valve housing;

a valve body interposed between said open end of said valve housing and said unit end cap assembly and sealingly engaged with said open end of said valve housing, said valve body having a fluid flow opening for enabling fluid to flow from said valve housing and at least one pressure responsive fluid flow opening for enabling fluid to flow into said valve housing through said pressure responsive opening in response to a predetermined fluid pressure; and

by-pass valve assembly facilitating means attached to said valve body and extending through said fluid flow opening in said closed end of said valve housing, for engaging a portion of said valve housing adjacent said opening in said closed end of said valve housing for maintaining said housing and said body as a unit prior to assembly of said valve into said fluid treatment assembly, said assembly facilitating means being substantially disengaged from said valve housing by the biasing force of said element hold down spring for preventing operation of said valve from being dependent upon said assembly facilitating means in said fluid treatment assembly.

4,028,244

APPARATUS FOR ESTABLISHING CONTACT BETWEEN A LIQUID AND A GAS

Leif Holmberg, Dragor, Denmark, assignor to European Plastic Machinery Mfg. A/S, Kopenhamn S, Denmark

Continuation of Ser. No. 495,002, Aug. 5, 1974, Pat. No. 3,956,127, which is a continuation of Ser. No. 326,725, Jan. 26, 1973, abandoned. This application Oct. 10, 1975, Ser. No. 622,278

Claims priority, application Sweden, Jan. 26, 1972, 72847

Int. Cl.² C02C *5/10*

U.S. Cl. 210—150 **9 Claims**

1. An apparatus for establishing contact between a liquid and a gas, comprising a cylindrical container having a circumferential wall and end walls, said container being packed with hollow filling bodies and mounted for rotation about a horizontal axis, at least the circumferential wall of the cylindrical container being perforated so that the liquid and the gas can flow therethrough, the hollow filling bodies being of sufficiently light weight to support the cylindrical container when said container is partially immersed in the liquid, said cylindrical container being substantially completely filled with said filling bodies.

4,028,245

ARRANGEMENT FOR CONVERSION OF FOREIGN MATTER CONTAINED IN WATER

Theo Stähler, Hadamar-Niederzeuzheim, Germany, assignor to Rheintechnik Weiland & Kaspar KG, Neunkirchen (Saar), Germany

Filed Feb. 23, 1976, Ser. No. 660,229

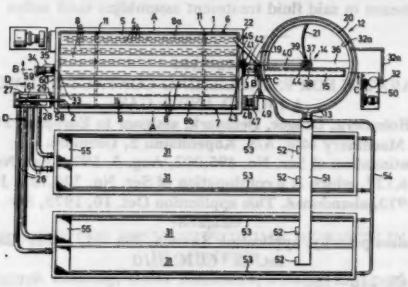
Claims priority, application Germany, Oct. 3, 1975, 2544177; Feb. 28, 1975, 2508749

Int. Cl.² C02C *5/10;* **A01K** *61/00*

U.S. Cl. 210—151 **25 Claims**

1. An arrangement for the conversion of foreign matter found in water, particularly sewage water, into harmless materials comprising, in combination, a conversion tank having an intake for water to be treated and having a drain for treated water; rotatable hollow means in said tank and having perforations in walls of said hollow means and emerging on one side completely out of water, the other side of said rotatable hollow means being immersed entirely into the water, said rotatable hollow means being filled with materials insoluble in the water and having a large surface area accessible to air and water; means for rotating said rotatable hollow means; a plurality of feeders to said intake of said conversion tank; a common collecting tank, all said feeders discharging into said collecting tank, said intake discharging from said collecting

tank; said collecting tank being substantially cylindrically-shaped; said feeders entering laterally the cylindrical wall of said collecting tank, the intake of said conversion tank discharging from a head end area of said collecting tank; an



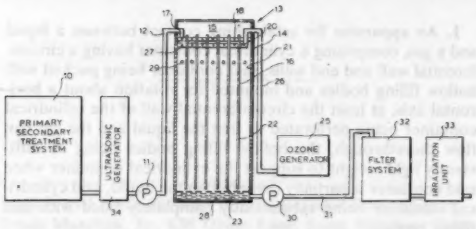
elastic lip rotatable inside said collecting tank and contacting the cylindrical wall of said collecting tank, said lip covering completely the individual feeders when traveling past said feeders.

4,028,246

LIQUID PURIFICATION SYSTEM

Norman S. Lund, 6525 New Haven; George Ralph Young, Jr., East River Drive, Melbourne, both of Fla. 32901, and Norman W. Lund, 612 W. Vine, Kissimmee, Fla. 32741

Filed Nov. 20, 1975, Ser. No. 633,669
Int. Cl.² C02B *3/08;* **C02C** *5/06*
U.S. Cl. 210—151 **8 Claims**



1. A liquid gas contactor unit for treating liquids with ozone comprising in combination:

a sealable container having a top portion and a bottom portion and at least two sidewalls having a plurality of elongated vertically extending grooves therein and supporting ledges located on said top portion thereof;

a plurality of panels each having its side edges supported in a pair of grooves and each said panel being individually supported from said sidewall ledges and being individually removable from said container;

a removal cover removably attached to said container for enclosing and sealing said container;

a plurality of fluid distribution lines located in spaced relationship to each other and to said panels and attached to said cover for removal therewith, said plurality of fluid distribution lines including a set of liquid distribution lines suspended from said removable cover and a plurality of gas distribution lines suspended from said cover;

at least one input line passing through said cover to said liquid distribution lines; and at least one input line passing through said cover to said gas distribution lines;

an ozone generator for generating ozone gas, said ozone generator being connected to said input line connected to said gas distribution line; and

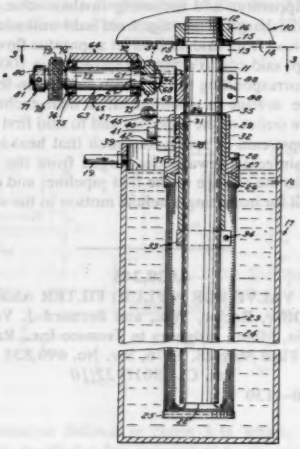
an output line operatively coupled to said container for removing liquid treated by said gas.

4,028,247

VIBRATORY COOLANT STRAINER FOR MACHINE TOOL COOLANT SYSTEMS

Harry A. Yessaian, 1035 Ridgemont Drive, Union Lake, Mich. 48085

Filed July 7, 1975, Ser. No. 593,646
Int. Cl.² B01D *33/00*
U.S. Cl. 210—153 **4 Claims**



1. In a machine tool having a cutting tool coolant system including a coolant reservoir and a fixed coolant supply pipe extended into the reservoir, the combination comprising:

a. a coolant strainer assembly operatively disposed in said reservoir;

b. means movably supporting said coolant strainer assembly on said fixed supply pipe for oscillating rotary movement thereabout, with said supply pipe extended into said strainer;

c. means for oscillating in a rotary motion said means for movably supporting the strainer assembly on said supply pipe to provide a vibrating, rotary oscillating motion to said strainer assembly to prevent a build-up of dirt and the like on the outer surface of said strainer assembly;

d. said means movably supporting said coolant strainer assembly including a mounting means attached to a strainer screen in said coolant strainer assembly; and,

e. said oscillating means includes:

1. a cam follower means attached to said mounting means; and,

2. a cam drive means engaged with said cam follower means for moving said cam follower means in one direction.

4,028,248

FLUID FILTER

Donald J. Murauskas, Painesville; Edward E. Kish, Jr., Kirtland; Frank M. Cunningham, Solon; Bernard J. Gallagher, Mayfield, and Earl D. Shufflebarger, Mentor, all of Ohio, assignors to Nupro Company, Willoughby, Ohio

Filed July 10, 1975, Ser. No. 594,613
Int. Cl.² B01D *25/02*
U.S. Cl. 210—232 **9 Claims**

1. A fluid filter comprising:

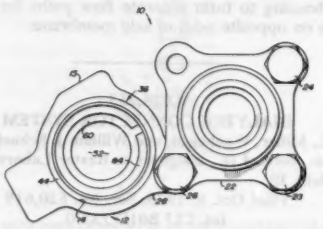
a main body member having oppositely disposed, generally planar end faces with a cylindrical through-passage extending through said body portion between said end faces;

a pair of end fitting members positioned adjacent to said main body member at opposite ends of said through-passage, each said end fitting member having a through-

opening generally aligned with said through-passage to define inlet and outlet openings;

connecting plural members extending between said end fittings for releasably clamping said end fittings and main body member together, whereby removal of only one of said connecting members ultimately permits outward pivoting of said main body member about one of said connecting members which has not been removed;

a filter cartridge positioned in said main body member through-passage, said filter cartridge comprising (1) a hollow open-ended cylindrical sleeve having inner and outer surfaces and an outer diameter dimensioned such that said sleeve is closely and slidably received in said through-passage and (2) at least one fluid filter element operably mounted within said sleeve and positioned



therein such that all fluid passing through said fluid filter from said inlet opening to said outlet opening will pass through said filter element;

means for positively retaining said filter cartridge in a desired position in said main body member through-passage when said pair of end fittings are clamped to said main body member at opposite ends of said through-passage, said retaining means permitting said filter cartridge to be axially removed from either end of said through-passage when at least the end fitting member associated with that end is removed therefrom; and,

seal elements positioned circumferentially about the ends of said sleeve to provide a fluid seal between the outer surface of said sleeve and said through-passage and to provide a fluid seal between said end fittings and said main body member.

4,028,249

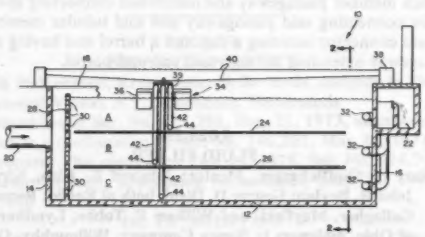
SEWAGE SETTLING TANK

Robert F. McGivern, Columbus, Ohio, assignor to Sybron Corporation, Rochester, N.Y.

Filed May 17, 1976, Ser. No. 686,946

Int. Cl.² B01D *21/10*; C02B *9/00*; C02C *1/26*

U.S. Cl. 210—242 R **9 Claims**



1. A sewage or water settling tank comprising:

a. a bottom and upstanding side and end walls defining said tank;

b. deck members spaced vertically in said tank to divide the same horizontally into a plurality of settling zones, said deck members being discontinuous across their width to provide an unobstructed vertical channel extending the full depth and length of said tank;

c. inlet means for liquid to be treated at one end of said tank and an outlet for treated liquid at the opposite end, each of said deck members and said tank bottom defining surfaces to receive sludge settling from the liquid in said tank during flow of the liquid from said inlet to said outlet means;

d. a carriage capable of floating on the surface of liquid in said tank;

e. a sludge removal siphon system carried by said carriage, said siphon system including a plurality of depending inlet legs each disposed in said vertical channel and each terminating in a horizontal branch extending over one of said deck members and said tank bottom for removing the sludge accumulating thereon; and

f. means for traversing said carriage from one end of said tank to the other whereby sludge is removed from substantially the full width and length of each deck member and said tank bottom.

2. A sewage or water settling tank comprising:

a. a bottom and upstanding side and end walls defining said tank;

b. a plurality of open, generally rectangular, buoyant frames dividing said tank into a plurality of horizontal settling zones, said frames each formed by joined lateral and transverse members, said lateral members extending generally the length of said tank and said transverse members extending less than one-half the width of said tank;

c. a hinge connecting each frame to a side wall of said tank;

d. a sheet material covering each of said open frames to provide settling surfaces spaced above the bottom of said tank; and

e. means for restraining said frames against the buoyancy thereof so as to maintain said frames in a horizontal orientation at predetermined vertically spaced submerged positions in said tank.

4. A sewage or water settling tank comprising:

a. a bottom and upstanding side and end walls defining said tank;

b. a plurality of vertically spaced deck members each hinged by hinge connections, along one edge to a side wall of said settling tank for dividing said tank into a plurality of horizontal settling zones;

c. float means for raising said deck members about said hinge connections; and

d. means for restraining said deck members against the buoyancy of said float means so as to maintain each of said deck members in a horizontal orientation at predetermined vertically spaced submerged positions in said tank.

4,028,250

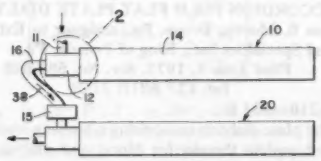
FILTRATION APPARATUS

John T. Loft, Summit, N.J., assignor to Amerace Corporation, New York, N.Y.

Filed May 30, 1975, Ser. No. 582,453

Int. Cl.² B01D *31/00*

U.S. Cl. 210—259 **12 Claims**



1. Filtration apparatus comprising:

a. tubular means, having at least one longitudinally extending slot therein for receiving a filtrate; and

b. filter means, said filter means being disposed in a plurality

of separate layers relative to said tubular means, said filter means comprising at least a pair of microporous members, said members being coupled together along a plurality of peripheral edges and defining at least a pair of uncoupled edges, said at least pair of uncoupled edges being adapted to engage sealing with said slot, and wherein at least one member of said pair of microporous members includes a plurality of spaced longitudinal extending channels reposed on a surface thereof between said coupled members for directing a filtrate into said tubular means through said slot; and

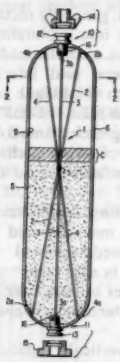
c. spacing means for separating said spearate layers of said filter means from one another; and for conveying unfiltered fluid between said layers.

4,028,251

AGITATOR FOR SOLIDS-CONTAINING VESSELS

William Deneen, 306 E. Forest St., Marengo, Ill. 60152

Filed Oct. 14, 1975, Ser. No. 621,849
Int. Cl.² B01D *27/12*
U.S. Cl. 210—280 **9 Claims**



1. An agitator for installation in a tank having opposite ends and containing loose solids comprising:

a. at least two rods,

b. means for securing said rods to each other at a crossing point intermediate their lengths to form

c. a cross member having portions extending toward the opposite ends of the tank in substantially opposite directions from the crossing point, wherein the portions of separate rods form obtuse angles with one another on opposite sides of the crossing point,

d. means of positioning said cross member in said tank, said positioning means including

e. free rod ends at each end of said cross member and spaced from each other a normal distance sufficient to abut an internal portion of the tank adjacent opposite ends of the tank.

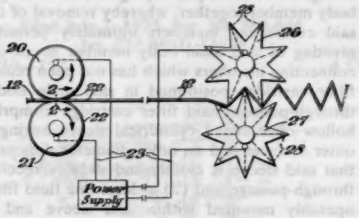
4,028,252

ACCORDION FOLD FLAT PLATE DIALYZER

Livingston B. Morris, Devon, Pa., assignor to Extracorporeal Medical Specialties Inc., King of Prussia, Pa.

Filed June 4, 1975, Ser. No. 583,648
Int. Cl.² B01D *31/00*
U.S. Cl. 210—321 B **14 Claims**

1. A flat plate dialyzer comprising a housing having separate inlets and outlets therein for blood and dialysate, a single continuous layer of flexible, nonwoven support material, said support material accordian folded along transverse score lines formed in the support material, a pattern on at least one side of said support material being oriented substantially perpendicular to the score lines whereby compaction of the support material is obtained by interdigitation of the pattern when accordian folded upon itself, a continuous layer of permeable membrane material placed within the accordian folds on one



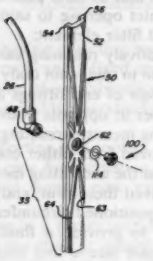
side of the support material to form a pleated stack and sealed in said housing to form separate flow paths for blood and dialysate on opposite sides of said membrane.

4,028,253

DIALYZER CONNECTOR SYSTEM

Jimmy L. Miller, Waukegan, and William J. Schnell, Arlington Heights, both of Ill., assignors to Baxter Laboratories, Inc., Deerfield, Ill.

Filed Oct. 8, 1975, Ser. No. 620,619
Int. Cl.² B01D *13/00*
U.S. Cl. 210—321 B **11 Claims**



1. A connector system for use in a dialyzer to connect an external fluid conduit and a tubularly-shaped, semipermeable membrane, having at least one connecting aperture in the wall thereof, and to protect said membrane from forces imposed on said conduit, said system including: a jack member adapted to be secured within said dialyzer and having means defining a fluid passageway therethrough, and means associated with one end of said jack member passageway for coupling said conduit and passageway in fluid communication; and a button-type connector for cooperation with the other end of said jack member passageway and membrane connecting aperture for connecting said passageway and said tubular membrane, said connector incuding a cap and a barrel and having a passageway extending through said cap and barrel.

4,028,254

FLUID FILTER

Earl D. Shufflebarger, Mentor; Edward E. Kish, Kirtland; John R. Boylan; George D. Diehl, both of Euclid; Bernard J. Gallagher, Mayfield, and William P. Tobbe, Lyndhurst, all of Ohio, assignors to Nupro Company, Willoughby, Ohio

Filed Oct. 14, 1975, Ser. No. 622,032
Int. Cl.² B01D *27/08*
U.S. Cl. 210—447 **25 Claims**

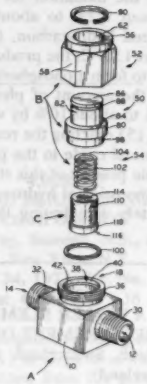
1. A fluid filter comprising:

a filter body including a fluid chamber therein having an open outer end and a seat area spaced axially therealong, a fluid inlet communicating with said chamber on one

side of said seat area and a fluid outlet communicating with said chamber on the other side of said seat area;

a fluid filter element disposed in said chamber with one end thereof communicating with said seat area;

a bonnet assembly adapted to close said chamber open end, said assembly being releasably retained on said filter body and comprising a bonnet and bonnet nut operably asso-



ciated with each other so as to permit rotational and axial movement therebetween;

means for continuously urging said filter element into said seat area; and,

a sealing ring disposed between said bonnet and filter body for sealing the interconnection of said bonnet assembly on said filter body in a fluid tight manner.

4,028,255

PREPARATION OF POLYMER COMPOSITES

Brian Alfred Bolto, Mitcham, and Robert James Eldridge, Moorabbin, both of Australia, assignors to ICI Australia Limited and Commonwealth Scientific and Industrial Research Organization, both of, Australia

Continuation of Ser. No. 432,988, Jan. 14, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 620,043

Claims priority, application Australia, Jan. 31, 1973, 2092/73

Int. Cl.[2] B01D *39/02;* **H01F** *1/00*

U.S. Cl. 210—500 R **1 Claim**

1. Filter aid comprising composite particles having an average size of particle in the range from 5 to 10 μm with at least 90% w/w of the particles having a size within 10 μm of the average size and from 75% to 85% w/w of each particle comprising a magnetic particulate material of size less than 5 μm embedded in a matrix of a thermoplastic linear polymeric material.

4,028,256

SEPARATION DEVICE

Jacob Pielkenrood, Krommenie, Netherlands, assignor to Pielkenrood-Vinitex N.V., Assendelft, Netherlands

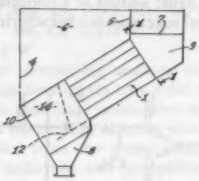
Continuation of Ser. No. 427,291, Dec. 21, 1973, abandoned, which is a continuation of Ser. No. 146,201, May 24, 1971, abandoned. This application Oct. 22, 1975, Ser. No. 624,703

Claims priority, application Netherlands, May 24, 1970, 7007498

Int. Cl.[2] B01D *21/00*

U.S. Cl. 210—519 **22 Claims**

1. A device for separating relatively light, such as floating components, and relatively heavy, such as precipitating components, from a liquid comprising: a plurality of corrugated plates, arranged in downward sloping relation with corrugation tops and valleys of the plates extending parallel to each other and in the direction of the downward slope, the plates being arranged spaced-apart transverse to the slope, the valleys and tops respectively defining downward sloping channels separated by ridges, the valleys and the tops of the plates being vertically aligned, each plate having upper and lower ends defined by edges having the alternating corrugation tops and valleys as wave-like contours extending along a horizontal, transversely to said direction; a plurality of vertically extending baffles placed side by side and in horizontally spaced-apart relation, the baffles being arranged outside of the space be-



tween the plates and being disposed adjacent to the edges of the plates of the plurality and at least at one end of the plates and in edge face-to-edge abutment therewith; the baffle plates of the plurality as disposed at the one end being respectively situated in the edge-to-edge arrangement adjacent similar phase points of the wave-like corrugation contours; and a comb-shaped plate, the teeth of which are situated at the discharge end of a component as separated from the liquid, and symmetrically between the guide baffles, the teeth extending toward one of the plate edges with corrugated contour.

4,028,257

COMPOSITION AND METHOD FOR REDUCING THE SURFACE TENSION OF AQUEOUS FLUIDS

James L. Thompson, Tulsa, Okla., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 527,577, Nov. 27, 1974, abandoned. This application Aug. 23, 1976, Ser. No. 716,508

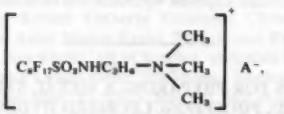
Int. Cl.[2] E21B *43/27, 43/26*

U.S. Cl. 252—8.55 C **11 Claims**

1. An aqueous composition suitable for use in treating subterranean formations comprising:

A. An aqueous liquid, and

B. dispersed in said aqueous liquid a perfluorinated surfactant of the formula



wherein A^- is Cl^-, F^-, I^-, or Br^-, and another surfactant consisting of an adduct of trimethyl-1-heptanol plus seven moles of ethylene oxide, said surfactants being present in an other surfactant:perfluorinated surfactant weigh ratio of from about 1:1 to about 40:1, and the total amount of said perfluorinated surfactant and said surfactant in said aqueous liquid ranging from about 0.005 to about 0.1 per cent by weight of said composition.

4,028,258

ALKYLENE OXIDE ADDUCTS OF PHOSPHOSULFURIZED N-(HYDROXYALKYL) ALKENYLSUCCINIMIDES

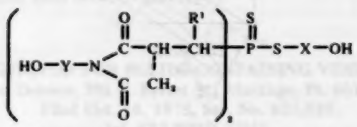
Mahmoud S. Kablaoui, Wappingers Falls, N.Y.; Robert E. Reid, Houston, and Arthur W. Godfrey, Sugarland, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 3, 1975, Ser. No. 636,906

Int. Cl.² C10M *1/48*

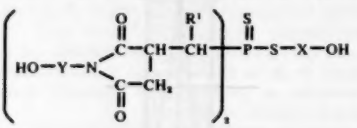
U.S. Cl. 252—46.7 **15 Claims**

1. An alkylene oxide adduct of a phosphosulfurized N-(hydroxyalkyl) alkenyl succinimide characterized by the formula:



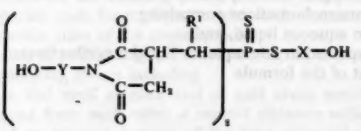
where R^1 is alkenyl of from 10 to 30 carbons and X and Y are divalent saturated hydrocarbon radicals of from 2 to 6 carbons.

6. An automatic transmission fluid composition comprising at least about 50 wt. % of a mineral lubricating oil and between about 0.01 and 50 wt. % of an alkylene oxide adduct of phosphosulfurized (N-hydroxyalkyl)-alkenylsuccinimide characterized by the formula:



where R^1 is alkenyl of from 10 to 30 carbons and X and Y are divalent saturated aliphatic hydrocarbon radicals of from 2 to 6 carbons.

11. A method for operating an automatic transmission which comprises supplying to said transmission a fully formulated lubricating oil composition comprising at least about 85 wt. % of a mineral lubricating oil and between about 0.01 and 5 wt. % of an alkylene oxide adduct of phosphosulfurized N-(hydroxyalkyl) alkenyl succinimide characterized by the formula:



where R^1 is alkenyl of from 10 to 30 carbons and X and Y are divalent saturated aliphatic hydrocarbon radicals of from 2 to 6 carbons.

4,028,259

PROCESS FOR PREPARING A METAL SALT OF AN OXIDIZED, PHOSPHOSULFURIZED HYDROCARBON AND LUBRICANT COMPOSITIONS CONTAINING SAME

Richard S. Herd, and Ferdinand P. Otto, both of Woodbury, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed May 29, 1975, Ser. No. 582,027

Int. Cl.² C10M *1/48*

U.S. Cl. 252—46.7 **5 Claims**

1. A process for preparing an oil-soluble, phosphorus and sulfur containing oxidized oil reaction product which comprises the steps of (1) preparing a mixture comprising (a) a hydrocarbon having a molecular weight of from about 200 to about 1000 and (b) from about 1% to about 10% based on the weight of said hydrocarbon of a metal oxide, the metal being selected from Group 1 or Group 2 of the Periodic Table, (2) contacting said mixture with an oxidizing gas at from about 100° C to about 300° C to effect oxidation of said hydrocarbon and reaction of said metal oxide with the oxidized hydrocarbon, (3) continuing the oxidation for a time sufficient to incorporate from about 0.2% to about 1.0% by weight of metal into the oxidized hydrocarbon, (4) reacting, at from about 100° C to about 150° C, the product from step (3) with a phosphorus sulfide to form a phosphorus-, sulfur- and metal-containing product, the amount of phosphorus sulfide used being from about 6% to about 10% by weight of the oxidized hydrocarbon charge, (5) reacting the reaction product of step (4) with additional metal oxide in the presence of water, the amount of metal oxide present at this stage being from about 2% to about 8% of the original hydrocarbon charge and (6) substantially completely dehydrating the mixture formed in step (5).

4,028,260

LIQUID FOR A FEELER ELEMENT FOR THE ELECTRICAL MEASUREMENT OF INCLINATIONS

Harry Zuest, Erlenbach, Switzerland, assignor to Contraves AG, Zurich, Switzerland

Continuation-in-part of Ser. No. 534,654, Dec. 19, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 640,879

Claims priority, application Switzerland, Jan. 17, 1974, 606/74

Int. Cl.² G01C *9/06*

U.S. Cl. 252—62.2 **10 Claims**

1. A liquid for a level or feeler element for the electrical measurement of inclinations and for the determination of the vertical by measuring an electrical current between surface electrodes, said liquid consisting essentially of at least about 50 percent by weight of hydrazine monohydrate and an effective amount of at least one conducting salt dissolved therein for increasing the electrical conductivity of said hydrazine monohydrate, said salt being chemically inert with said hydrazine monohydrate.

4,028,261

TILE AND GROUT CLEANER AND RESTORER

Arthur W. Petersen, Chatham Township; Arthur Cimiluca, Wood-Ridge, and Leonard Hirschberger, Marlboro, all of N.J., assignors to Frederick G. Schwarzmann, Kearny, N.J.

Filed Feb. 17, 1976, Ser. No. 658,300

Int. Cl.² C11D *7/02, 3/14*

U.S. Cl. 252—89 R **6 Claims**

1. A composition for cleaning tile and grout and renewing grout consisting essentially of an aqueous solution of 0.1 to 10% by weight on a dry basis of a sequestering agent, 0.1 to 10% by weight on a dry basis of a surfactant compatible with the binding agent and 10 to 60% by weight on a dry basis of a water insoluble pigment and a water-soluble or water-dispersible organic binding agent which dries to a water resistant film, the ratio of pigment to binding agent being 5:1 to 1:5.

4,028,262

CITRATE-CARBONATE BUILT DETERGENT

Bao-Ding Cheng, Highland Park, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 297,972, Oct. 16, 1972, abandoned. This application Jan. 24, 1975, Ser. No. 543,848

Int. Cl.² C11D *7/34, 3/34*

U.S. Cl. 252—89 R **2 Claims**

1. A phosphate-free nonionic-based detergent composition consisting essentially of, approximately by weight, 5 to 30% of a synthetic detergent selected from the group consisting of nonionic reaction products of 6 to 30 moles of ethylene oxide

with higher fatty alcohols and 1:1 by weight mixtures thereof with dodecyl benzene sulfonate, 45 to 55% of sodium carbonate, and 10 to 33% of sodium citrate. the sodium carbonate and sodium citrate being correlated so that the weight ratio of sodium carbonate to sodium citrate is less than or equal to about 2 under washing conditions of water of 150ppm hardness and 40° C.

4,028,263

BLEACHING AND BRIGHTENING DETERGENT COMPOSITION

Frederick William Gray, Summit, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Aug. 24, 1973, Ser. No. 391,058
Int. Cl.² C11D 7/56
U.S. Cl. 252—99 **12 Claims**

1. A bleaching and brightening detergent composition comprising by weight about 7 to 30 parts of water soluble synthetic organic detergent selected from the group consisting of anionic detergents, nonionic detergents and mixtures of anionic with nonionic organic detergents, about 9 to 70 parts of water soluble builder salt(s) selected from the group consisting of alkali metal silicates, pyrophosphates, tripolyphosphates, citrates, bicarbonates, and carbobates, about 2 to 80 parts of water soluble alkali metal peroxymonosulfate bleaching agent promoted by about 0.05 to 1.5 equivalent proportions of a water soluble alkali metal bromide per equivalent proportion of active oxygen in the peroxymonosulfate, and from about 0.05 to 3 parts of organic optical brightening agent(s) selected from the group consisting of

a. 4,4′-bis-(4-phenyl-2H-1,2,3-triazol-2-yl)-2,2′-stilbene disulfonic acid and salts thereof,
b. 4-(2-naptho-1,2-triazolyl)-stilbene-2-sulfonic acid and salts thereof, and
c. 2,2′(4,4′-divinylbiphenyl)-dibenzenesulfonic acid and salts thereof, and the sum of the parts is from about 21 to 100.

4,028,264

POLYBUTENE COMPOSITION CONTAINING HALO-CARBONYL ADDITIVES AND USE THEREOF

Imre Puskas, Glen Ellyn, and John A. Cengel, Wheaton, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Division of Ser. No. 358,958, May 10, 1973, Pat. No. 3,953,475. This application Apr. 18, 1975, Ser. No. 569,374
Int. Cl.² C07D 307/36
U.S. Cl. 252—182 **4 Claims**

1. A composition comprising 300–3000$\overline{M}_n$ polybutene and based on the weight thereof as additive from 5 to 200 ppm of an alpha-bromo dialkyl ketone having in addition to the keto-carbonyl carbon atom up to a total of twenty carbon atoms, or alpha-dibromo-substituted alkyl diketone wherein its two keto-carbonyl carbon atoms are in a chain of from 4 to 22 carbon atoms and each bromo-substituent is on a chain carbon atom adjacent to a keto-carbonyl carbon atom, or alpha-bromo aceto-phenone or naphthone, or C_1–C_{10} dialkyl acetal of alpha-bromo acetaldehyde which additive has a normal boiling point in the range of from 40° C up to 225° C.

4,028,265

PROCESS FOR CONVERTING SODIUM NITRATE-CONTAINING, CAUSTIC LIQUID RADIOACTIVE WASTES TO SOLID INSOLUBLE PRODUCTS

Gary S. Barney, and Lloyd E. Brownell, both of Richland, Wash., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Continuation-in-part of Ser. No. 457,325, April 2, 1974. This application Aug. 25, 1975, Ser. No. 607,853
Int. Cl.² G21F 9/16
U.S. Cl. 252—301.1 W **7 Claims**

1. A method for converting sodium nitrate-containing, caustic, liquid radioactive wastes to a solid relatively insoluble, thermally stable, salt-filled radioactive mineral form consisting essentially of the steps of reacting powdered aluminum silicate clays selected from the group consisting of kaolin, bentonite, dickite, halloysite and pyrophillite with aqueous solutions or slurries of said caustic, liquid, radioactive wastes which have a sodium hydroxide concentration of at least about 3 to about 7 M at a temperature of about 30° C to 100° C to thereby entrap radioactive isotopes in the crystalline aluminosilicate framework structure of cancrinite reaction product, air drying said cancrinite reaction product and firing the resultant product at a temperature of at least 600° C to form said solid, salt-filled, radioactive mineral form.

4,028,266

STABILIZED HYDROUS PENTAVALENT ANTIMONY OXIDE SOL COMPOSITION AND ITS PRODUCTION, PRODUCTION OF DRY POWDER FROM SOL COMPOSITION AND RESULTING DRY POWDER

Ronald Francis Langere, Cranbury, and Otto Ernest Loeffler, Rahway, both of N.J., assignors to NL Industries, Inc., New York, N.Y.

Filed Apr. 15, 1976, Ser. No. 677,313
Int. Cl.² B01J 13/00; B01F 3/12
U.S. Cl. 252—313 R **4 Claims**

1. A stable aqueous antimony pentoxide sol comprising from 25% to 35% antimony pentoxide, from 6.5% to 17% of an amine and the remainder water, said sol prepared by admixing antimony trioxide, an amine and water and to said mixture adding H_2O_2 slowly with refluxing for a period of 5 minutes to 1½ hours then cooling the mixture, thus forming the stable sol, the amount of ingredients added for each part of antimony trioxide being from 1.2 to 2.5 parts of water, from 0.2 to 0.6 parts of an amine and from 0.65 to 0.68 parts of hydrogen peroxide, all of the parts and percentages expressed on a weight basis, said amine being selected from the group consisting of secondary and tertiary aliphatic amines having from 1 to 5 carbon atoms and cyclicamines.

4,028,267

METHOD AND APPARATUS FOR MEASURING THE CONCENTRATION OF A COMPONENT, FOR INSTANCE IRON, IN A MATERIAL

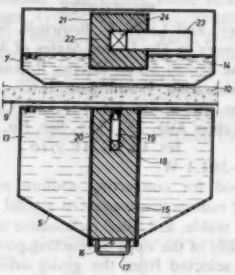
Adolf Ragnar Roland Umberto Einarsson Christell, Stockholm; Kaljo Aatto Matias Koski, Tyreso, and Knut Lennart Ljunggren, Stockholm, all of Sweden, assignors to Stiftelsen Isoptekniska Laboratoriet, Stockholm, Sweden

Filed Mar. 27, 1975, Ser. No. 562,460
Claims priority, application Sweden, Apr. 9, 1974, 7404824
Int. Cl.² G01N 23/02
U.S. Cl. 250—359 **16 Claims**

1. In the method of measuring the concentration of a component in a material sample, which at the measuring location is at rest or moves as a stream of material, that improvement which includes

irradiating said sample with thermally-moderated neutrons and detecting resultant gamma ray emission from said sample to provide a base line measurement;

irradiating said sample with unmoderated neutrons to provide a gamma ray emission from said sample and measuring same; and



determining said concentration by comparison of known gamma ray emissions relative to concentration

whereby the concentration of said component in said material sample may be determined.

4,028,268

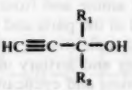
HIGH TEMPERATURE CORROSION INHIBITOR

Daniel S. Sullivan, 3rd, Houston, Tex.; Charles E. Strubelt, Tamare, Venezuela, and Kenneth W. Becker, Houston, Tex., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Dec. 3, 1975, Ser. No. 637,168
Int. Cl.² C23F *11/04*
U.S. Cl. 252—392 **22 Claims**

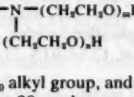
1. A corrosion inhibitor composition comprising:

1. from about 25 to about 60 weight percent of a quaternary compound of (i) a heterocyclic nitrogen base selected from the group consisting of quinoline, acridine and phenanthridine and (ii) a halomethylated polycyclic aromatic compound selected from the group consisting of halomethylated indane, indene, naphthalene, anthracene, phenanthrene, acenaphthene, fluorene, xanthene, chrysene and pyrene, halomethylated petroleum fractions containing C_9 to C_{12} aromatic hydrocarbons, and halomethylated polystyrenes having molecular weights ranging from about 100 to about 5,000;
2. from about 5 to about 30 weight percent of an aliphatic acetylenic alcohol having the structural formula of



wherein R_1 is selected from the group consisting of hydrogen and a methyl group and R_2 is selected from the group consisting of hydrogen and alkyl groups containing from 1 to about 7 carbon atoms;

3. from about 0.01 to about 15 weight percent of a water-soluble surfce active agent selected from the group consisting of polyethoxylated octyl phenol and polyethoxylated amines having the structural formula of



wherein R is a C_5 to C_{50} alkyl group, and m and n are numbers ranging from 1 to about 20; and

4. from about 30 to about 75 weight percent of a formic acid derivative having the formula of

wherein Z is selected from the group consisting of an alkoxy group containing from 1 to about 4 carbon atoms, an amino radical, and an alkyl-substituted amino group containing from 1 to about 4 carbon atoms.

4,028,269

PROCESS FOR THE PREPARATION OF A SOLID BED CATALYST SYSTEM

David H. J. Carlson, Park Ridge; Thomas A. Verachtert, Wheeling, and Jay E. Sobel, Highland Park, all of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Aug. 21, 1975, Ser. No. 606,635
Int. Cl.² B01J *31/12, 31/02*
U.S. Cl. 252—428 **11 Claims**

1. A process for the preparation of a solid bed catalyst system which comprises:

a. treating a charcoal-containing solid support with an atmosphere comprising steam and a substantially inert gas at a temperature of from about 800° F. to about 950° F. for a period of time comprising from about 2 hours to about 6 hours;
b. drying the treated charcoal-containing solid support in an atmosphere comprising a substantially inert gas at drying conditions;
c. impregnating the dried charcoal-containing solid support at impregnation conditions with from about 0.001 wt. % to about 10.000 wt. % of a metal phthalocyanine compound; and
d. recovering the resultant metal phthalocyanine impregnated charcoal-containing solid support.

4,028,270

VINYL POLYMERIZATION INITIATOR AND REDUCING AGENT

Oh-Kil Kim, Burke, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 15, 1976, Ser. No. 696,238
Int. Cl.² C08F *4/08*
U.S. Cl. 252—428 **3 Claims**

1. An olefinic polymerization initiator comprising a micellar complex of a micell-forming cationic detergent selected from the class consisting of C_{10} to C_{18} aliphatic-trimethylammonium bromide, C_{10} to C_{18} aliphatic-trimethylammonium chloride, hexadecyl pyridinium bromide, and hexadecylpyridinium chloride and a sodium or potassium bisulfite in a detergent-to-bisulfite mole ratio from 1:2 to 50:1.

4,028,271

BINDING RESIN FOR FOUNDRY SAND AND CATALYST THEREFOR

William J. Schaidle, Urbana, and Patrick H. Stewart, Danville, both of Ill., assignors to Core-Lube, Inc., Danville, Ill.

Filed Apr. 3, 1975, Ser. No. 564,854
Int. Cl.² B01J *27/02, 27/12*
U.S. Cl. 252—429 R **5 Claims**

1. An acid catalyst for curing of resin-sand mixtures in the foundry industry comprising as the active ingredients thereof a mixture of an organic acid in a major amount said amount being effective for curing a resole phenolformaldehyde resin and selected from the group consisting of benzene sulfonic acid and toluene sulfonic acid and mixtures thereof; a solvent therefore, and from 0.1 to 5.0% by weight of an acid fluoride selected from the group consisting of hydrofluoric acid and fluorosilicic acid.

4,028,272

PROCESS OF POLYMERIZATION OF CONJUGATED DIOLEFINS USING IRON CATALYSTS AND SULFUR LIGANDS

Morford C. Throckmorton, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 526,356, Nov. 22, 1974, Pat. No. 3,936,432. This application July 31, 1975, Ser. No. 600,684
Int. Cl.² C08F 4/70
U.S. Cl. 252—429 B 2 Claims

1. A catalyst composition consisting essentially of (1) an iron compound selected from the group consisting of ferric oxalate, ferric hexanoate, ferric octanoate, ferric decanoate, ferric stearate, ferric naphthenate, ferrous acetylacetonate, ferric acetylacetonate, ferric-1-ethoxy-1,3-butanedionate, ferrous dimethyl glyoxime, ferric chloride, ferrous chloride, ferric bromide, ferric phosphate, iron tetracarbonyl, iron pentacarbonyl and iron nonacarbonyl, (2) an organometallic compound selected from the group consisting of trialkylaluminums, dialkylaluminum halides, dialkylaluminum hydrides and dialkylaluminum alkoxides, and (3) a sulfur containing ligand selected from the group consisting of N,N′-dimethyldithiooxamide, dithiooxamide, N,N′-dicyclohexyldithiooxamide, N,N′-didodecyldithiooxamide, 2-mercaptobenzimidazole, 5-methyl-2-mercaptobenzimidazole, 5-chloro-2-mercaptobenzimidazole, thiourea and N,N′-diphenylthiourea, in which the molar ratio of the sulfur ligand to the iron compounds (S/Fe) ranges from about 0.1/1 to about 100/1 and when the organometallic compound is an aluminum trialkyl, the molar ratio of the aluminum trialkyl to the iron compound (Al/Fe) ranges from about 1/1 to about 400/1 and when the organometallic compound is a dialkylaluminum halide or a dialkylaluminum hydride, or a dialkylaluminum alkoxide, then the organometallic component to the iron component (AlX/Fe) can be varied from about 6/1 to about 25/1.

4,028,273

METHOD OF CATALYST MANUFACTURE

Mark J. O'Hara, Mount Prospect, Ill., and William K. T. Gleim, Seattle, Wash., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 450,630, March 13, 1974, abandoned. This application Oct. 15, 1975, Ser. No. 622,580
Int. Cl.² B01J 21/02
U.S. Cl. 252—432 10 Claims

1. In a method of manufacturing a catalytic composite consisting essentially of a Group VIII metal and a Group VIB metal composited with a refractory inorganic oxide-boron phosphate carrier material, the steps of:

a. precipitating in inorganic oxide hydrogel from a hydrosol of at least one inorganic oxide selected from the group consisting of alumina, silica, zirconia, thoria, and boria;

b. admixing the inorganic oxide hydrogel with a dried, finely divided form thereof in an amount to provide from about 5 to about 50 wt. % of said catalytic composite;

c. impregnating the resulting mixture with an aqueous solution containing sufficient boric and phosphoric acids to provide a catalytic composite comprising from about 13 to about 35 wt. % boron phosphate;

d. drying the resulting mixture and further impregnating the same with a decomposable Group VIII metal compound and a decomposable Group VIB metal compound in amounts sufficient to incorporate from about 0.1 to about 10 wt. % Group VIII metal and from about 5 to about 20 wt. % Group VIB metal into said catalytic composite; and

e. drying and calcining the resultant mixture in an oxidizing atmosphere.

4,028,274

SUPPORT MATERIAL FOR A NOBLE METAL CATALYST AND METHOD FOR MAKING THE SAME

Harold Russell Kunz, Vernon, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed June 1, 1976, Ser. No. 691,921
Int. Cl.² B01J 21/18, 23/42
U.S. Cl. 252—447 22 Claims

20. A supported platinum catalyst made according to the following process:

heat treating a carbon powder at temperatures above about 1250° C to at least partially graphitize the carbon;

depositing a metal oxidizing catalyst on the surfaces of the heat treated carbon particles;

oxidizing the surfaces of the heat treated carbon particles in the presence of the metal oxidizing catalyst at a temperature sufficiently high to cause oxidation of the surfaces at the sites of the metal oxidizing catalyst, but not high enough to oxidize the heat treated carbon surfaces where no metal oxidizing catalyst is present;

removing the metal oxidizing catalyst; and

depositing platinum on the oxidized particles.

4,028,275

PROCESS FOR PREPARING CATALYTIC MATERIALS FOR PURIFYING EXHAUST GAS AND CATALYTIC MATERIALS PREPARED THEREBY

Toshiyuki Sakai, Funabashi; Koichi Matsuo, Tachikawa, and Yukihiro Tochio, Tokyo, all of Japan, assignors to Mitsui Mining & Smelting Co., Ltd., Japan

Continuation-in-part of Ser. No. 432,909, Jan. 14, 1974, abandoned. This application Sept. 29, 1975, Ser. No. 617,396
Claims priority, application Japan, Jan. 24, 1973, 48-9553
Int. Cl.² B01J 23/40, 23/42, 23/44
U.S. Cl. 252—466 PT 13 Claims

1. A process for preparing a catalyst for purifying exhaust gas comprising the steps of:

impregnating a heat-resistant ceramic material as the carrier for the catalyst with an impregnating liquid consisting essentially of an aqueous solution containing (A) 0.1–60 g/l calculated as the metal ion of at least one Platinum Group metal compound selected from the group consisting of platinous chloride, platinic chloride, chloroplatinous acid, chloroplatinic acid, platinous potassium chloride, platinic potassium chloride, palladium chloride, palladium nitrate, palladium acetate and palladium sulfate and (B) at least one organic compound selected from the group consisting of (1) organic nitrogen compounds which are azodicarbonamide, cyanuric acid, azobisisobutyronitrile, guanidine and melamine and (2) organic phosphorus compounds which are trimethyl phosphite, triethyl phosphite and diethyl phosphite, said at least one organic compound (B) being in an amount of 0.5–6 mols per mol of the Platinum Group metal,

drying the thus-impregnated carrier,

keeping the thus-dried impregnated carrier in a reducing gas stream at an elevated temperature to reduce the Platinum Group metal compound (A) impregnated in the carrier, and

calcining the thus-reduced impregnated carrier at a temperature not lower than the temperature at which said at least one organic compound (B) is thermally decomposed, for a time enough to burn off the organic compound (B) impregnated in the carrier thereby obtaining the desired catalyst.

4,028,276
PRESSURE-SENSITIVE ELASTIC RESISTOR COMPOSITIONS

John Charles Harden, Wilmington, and Sebastian V. R. Mastrangelo, Hockessin, both of Del., assignors to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Continuation-in-part of Ser. No. 411,425, Oct. 31, 1973, abandoned. This application Mar. 27, 1975, Ser. No. 562,937
Int. Cl.² H01B 1/04
U.S. Cl. 252—513 22 Claims

1. A pressure-sensitive composition adaptable for use as an elastic resistor which comprises

i. metallic-conductive particles having Knoop microhardness at 100 grams applied load (K_{100}) of at least 500 Kg/mm², and electrical resistivity of less than 1000 microohm-cm, and being from 0.01 to 50 microns in their largest dimension, said particles being selected from at least one member of the group consisting of (a) the electrically conductive borides, carbides, nitrides, silicides and germanides of a transition metal selected from Periodic Groups III through VIII, and (b) the alloy of metal A, metal B, silicon and, optionally, chromium, metal A being cobalt, nickel or iron present at 50 to 78 atomic percent, metal B being molybdenum or tungsten present at 18 to 34 atomic percent, Si being present at 4 to 22 atomic percent, and chromium being present at 0 to 28 atomic percent, and

ii. elastomer having an interaction parameter, Z, with said particles of from 1.5 to 1.75, said particles being distributed in the elastomer to form a volume fraction, ϕ_f, of the composition that provides a first relatively high resistance in the uncompressed state and a second relatively low resistance in the compressed state; the value for Z being determined by the equation

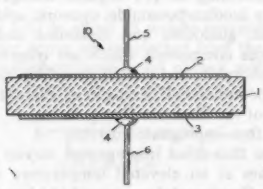
$$Z = \frac{E_c'/E_o'-1}{E_c'/E_o'+1.5}/\phi_f$$

wherein E_c' is the elastic modulus of the particle-filled elastomer composition and E_o' is the elastic modulus of the unfilled elastomer.

4,028,277
VOLTAGE-DEPENDENT RESISTOR

Mikio Matsuura; Nobuji Nishi, both of Hirakata; Michio Matsuoka, Ibaragi, and Takeshi Masuyama, Takatsuki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Jan. 6, 1975, Ser. No. 538,778
Claims priority, application Japan, Feb. 20, 1974, 49-20819; Feb. 20, 1974, 49-20820; Feb. 20, 1974, 49-20822; Apr. 17, 1974, 49-44311
Int. Cl.² H01B 1/08
U.S. Cl. 252—519 2 Claims



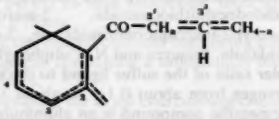
1. A voltage-dependent resistor of bulk-type comprising a sintered body consisting essentially of, as a main constituent, zinc oxide (ZnO) and, as additives, 0.1 to 5.0 mole percent of bismuth oxide (Bi_2O_3), 0.1 to 3.0 mole percent of titanium oxide (TiO_2) and 0.01 to 5.0 mole percent of strontium oxide (SrO), and electrodes applied to opposite surfaces of said sintered body.

4,028,278
CYCLOALIPHATIC UNSATURATED KETONES AS FRAGRANCE MODIFYING AGENTS

George H. Buchi, and Hans Wuest, both of Cambridge, Mass., assignors to Firmenich S.A., Geneva, Switzerland

Continuation of Ser. No. 532,649, Dec. 13, 1974, abandoned, which is a division of Ser. No. 281,220, Aug. 16, 1972, Pat. No. 3,890,370. This application May 6, 1976, Ser. No. 683,939
Claims priority, application Switzerland, Aug. 17, 1971, 12119/71
Int. Cl.² C11B 9/00; C07C 49/48
U.S. Cl. 252—522 7 Claims

1. A perfume composition which comprises as one of its active ingredients, for enhancing, improving or modifiying its floral or fruity character, a small but effective amout of a compound having the formula



VIII

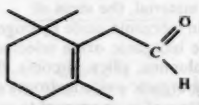
containing a double bond in the 2'- or 3'-position of the side chain and either two conjugated double bonds in the (endocyclic) 2- and (endocyclic) 4-, or (exocyclic) 2- and 3- positions of the ring, or two non-conjugated double bonds in the 1- and 4-positions of the ring, the double bonds being represented by the dotted lines, and whereas n stands for the integers 1 or 2.

4,028,279
NOVEL FRAGRANCE COMPOSITIONS CONTAINING 2,6,6 TRIMETHYL-1-CYCLOHEXEN-1-YL ACETALDEHYDE AND PHENYL C_8 KETONE

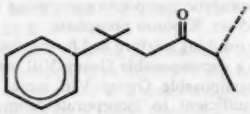
Anton Van Ouwerkerk, Livingston, N.J.; Bernard J. Chant, North Rye, and Arthur L. Liberman, Beechhurst, both of N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Aug. 4, 1975, Ser. No. 601,727
Int. Cl.² C11B 9/00
U.S. Cl. 252—522 4 Claims

1. A mixture consisting essentially of (i) 2,6,6-trimethyl-1-cyclohexen-1-ylacetaldehyde having the structure:



and (ii) a phenyl C_8 ketone having the structure:



wherein the dashed line represents a carbon-carbon single bond or a carbon-carbon double bond; the weight ratio of said 2,6,6-trimethyl-1-cyclohexen-1-ylacetaldehyde:phenyl C_8 ketone being in the range of from about 1:1 up to about 1:5.

4,028,280
NON-PHOSPHATE OR REDUCED PHOSPHATE DETERGENT COMPOSITIONS CONTAINING MIXTURES OF ALKYL ETHER SULFATES

Moriyasu Murata, Chiba; Fumio Sai, Funabashi, and Takashi Fujino, Yokohama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Aug. 18, 1976, Ser. No. 715,379
Claims priority, application Japan, Sept. 4, 1975, 50-107367
Int. Cl.² C11D *3/065, 3/08, 1/14*
U.S. Cl. 252—526 **7 Claims**

1. A detergent composition consisting essentially of from 0.5 to 60 percent by weight of ether sulfate surfactant consisting of

A. a mixture of

up to 70 percent by weight of unbranched-alkyl ether sulfate having the formula

$$R_1—O—(CH_2CH_2O)_nSO_3M \quad (I)$$

and

the balance is branched-alkyl ether sulfate having the formula

$$R_2—\underset{\displaystyle R_3}{\underset{|}{CH}}—CH_2—O—(CH_2CH_2O)_nSO_3M \quad (II)$$

wherein R_1 is unbranched alkyl having a carbon atom number range of from 6 to 15 and wherein the average number of carbon atoms in R_1 of (I) is within the range of from 8 to 13, R_2 is unbranched alkyl having a carbon atom number range of from one to 12, R_3 is unbranched alkyl having a carbon atom number range of from one to 4, with the proviso that

$$R_2—\underset{\displaystyle R_3}{\underset{|}{CH}}—CH_2—$$

has an average number of carbon atoms in the range of from 8 to 13, n is a number from 0.5 to 1.5 as an average for each of (I) and (II), and M is a water-solubilizing cation selected from the group consisting of alkali metals, alkaline earth metals, ammonium and alkanol amines;

and

B. an unbranched alkyl ether sulfate, or mixtures thereof, having the formula (III):

$$R_4—O—(CH_2CH_2O)_mSO_3M \quad (III)$$

wherein R_4 is unbranched alkyl having from 14 to 20 carbon atoms and R_4 has 18 carbon atoms for at least 80 percent by weight of the entirety of component (B), m is 1 to 50 on the average and M is as defined above for formulae (I) and (II),

the ratio of (A) to (B) being in the range between 95:5 and 5:95 and the balance is water-soluble, anionic surfactant with the proviso that said anionic surfactant is not an ether sulfate, or water-soluble, synthetic, nonionic surfactant, or water-soluble, synthetic, amphoteric surfactant, or water-soluble alkaline or neutral inorganic builder salt, or water-soluble heavy metal-sequestering agents, or solubilizing agents, or water, or mixtures thereof.

4,028,281
METAL PLATE TREATING SOLUTION

Ben Millard, South Windham, and Susan P. Robie, Gorham, both of Maine, assignors to Scott Paper Company, Philadelphia, Pa.

Filed Dec. 8, 1975, Ser. No. 638,926
Int. Cl.² B41N *3/06;* **C11D** *3/08, 3/33;* **C23G** *5/02*
U.S. Cl. 252—527 **5 Claims**

1. An aqueous solution capable of cleaning and imparting a hydrophilic silicate coating onto a metal surface, said solution comprising:

from 0.5 parts by weight to 10.0 parts by weight of an alkali metal silicate;

from 0.05 parts to 5.0 parts by weight of a water active surfactant;

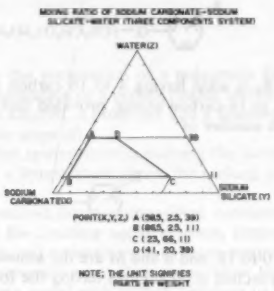
from 1.0 parts to 5.0 parts of a ferric chelate of ethylene diamine tetra acetic acid;

and water.

4,028,282
METHOD OF MANUFACTURING GRANULAR DETERGENTS

Osamu Okumura, Funabashi; Takenobu Sakatani, Chiba; Izumi Yamane, Yokohama, and Toshinobu Kashiwada, Chiba, all of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Filed May 5, 1976, Ser. No. 683,387
Claims priority, application Japan, May 14, 1975, 50-57094
Int. Cl.² C11D *1/14, 3/10*
U.S. Cl. 252—537 **3 Claims**



1. A method of manufacturing a granular detergent which comprises the steps of:

heating to a temperature of from 70° to 180° C a detergent slurry consisting essentially of

a. from 10 to 30 weight percent of olefin sulfonate having from 10 to 22 carbon atoms

b. from 60 to 90 weight percent of a mixture of sodium carbonate, sodium silicate and water, wherein the proportions of the ingredients of said mixture are on or within the closed polygon defined by points A, B, C and D in FIG. 1 of the attached drawings and wherein the molar ratio of SiO_2 to Na_2O in said sodium silicate is in the range of from 2/1 to 3/1, and

c. from zero to 30 weight percent of other detergent additives,

and then atomizing said slurry and cooling it in an atmosphere having a temperature of room temperature or lower to transform same to granules.

4,028,283
GRANULAR OR POWDERY DETERGENT COMPOSITION

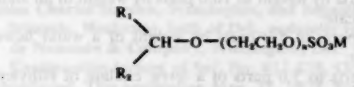
Moriyasu Murata, Chiba; Fumio Sai, Funabashi, and Takashi Fujino, Yokohama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Sept. 21, 1976, Ser. No. 725,184
Claims priority, application Japan, Sept. 30, 1975, 50-117816
Int. Cl.² C11D *1/06, 1/37*
U.S. Cl. 252—551 **5 Claims**

1. A granular or powdery detergent composition consisting essentially of

I. from 2 to 40 percent by weight of a first surfactant having a tendency to cake selected from the group consisting of

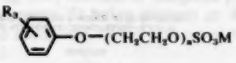
a. alkylethoxy sulfates having the formula



wherein R_1 and R_2, which can be the same or different, are hydrogens, alkyls having one to 17 carbon atoms, or alkenyls having two to 17 carbon atoms, provided that the average carbon atom number of

is from 10 to 18 carbon atoms, n is a number of from 0.5 to 5, and M is an alkali metal or an alkaline earth metal,

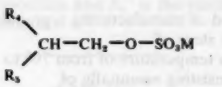
b. alkylphenylethoxy sulfates having the formula



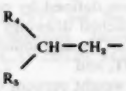
wherein R_3 is alkyl having 4 to 16 carbon atoms or alkenyl having 4 to 16 carbon atoms, provided that the average carbon atom number of

is from 10 to 18, and n and M are the same as defined above,

c. branched alkyl sulfates having the formula

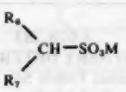


wherein R_4 and R_5, which can be the same or different, are alkyls having one to 15 carbon atoms or alkenyls having two to 15 carbon atoms, provided that

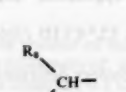


contains from 10 to 18 carbon atoms, and M is the same as defined above,

d. alkane sulfonates having the formula

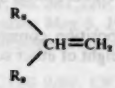


wherein R_6 and R_7, which can be the same or different, are hydrogens or alkyls having one to 17 carbon atoms, provided that



contains from 10 to 18 carbon atoms, and M is the same as defined above,

e. sulfonate salts of vinylidene olefins having the formula



wherein R_8 and R_9, which can be the same or different, are alkyls having one to 15 carbon atoms, provided that the number of carbon atoms in the olefin molecule is from 10 to 18, and the salt-forming cation is an alkali metal or alkaline earth metal,

f. sulfonate salts of internal olefins having the formula

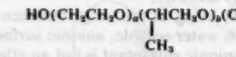
$$R_{10}HC{=}CHR_{11}$$

wherein R_{10} and R_{11}, which can be the same or different, are hydrogens or alkyls having one to 17 carbon atoms, provided that the number of carbon atoms in the olefin molecule is from 10 to 20 and further provided that in up to 80 wt.% of the olefin molecules, one of R_{10} and R_{11} can be hydrogen, and in the balance of the olefin molecules, neither of R_{10} and R_{11} is hydrogen, and the salt-forming cation is an alkali metal or alkaline earth metal,

g. ethylene oxide nonionic surface active agents having an HLB value of from 8 to 18 and selected from the group consisting of polyoxyethylene (6 to 12) alkyl (C_{12} to C_{18}) or alkenyl (C_{12} to C_{18}) ethers, polyoxyethylene (6 to 12) alkyl (C_8 to C_{10}) phenyl ethers, polyoxyethylene (8 to 20) saturated or unsaturated fatty acid (C_{12} to C_{18}) esters and polyoxyethylene (4 to 20) sorbitan saturated or unsaturated fatty acid (C_{12} to C_{18}) esters, and mixtures thereof,

II. from 0.2 to 20 weight percent of an anti-caking agent, being a carboxylic acid or an alkali metal salt thereof, obtained by reacting at 50 to 100° C without any catalyst

A. a polyalkylene glycol selected from the group consisting of (i) polyethylene glycol having an average molecular weight of from 2000 to 10000 and (ii) a nonionic surfactant having the formula



wherein $140 \leq a + c \leq 200$ and $30 \leq b \leq 40$, with

B. an acid anhydride selected from the group consisting of maleic anhydride, phthalic anhydride and succinic anhydride, at a molar ratio of A/B of from 1/2 to 1/1, wherein the weight ratio of II/I is from 1/10 to 3/2,

III. from zero to 20 percent by weight of second surfactant selected from the group consisting of alkylbenzene sulfonates in which the alkyl has 10 to 16 carbon atoms, linear alkyl sulfates having an average of 11 to 18 carbon atoms, α-olefin sulfonates having 10 to 20 carbon atoms and mixtures thereof, and

IV. from 10 to 40 weight percent water-soluble inorganic alkaline detergent builders, or water-soluble inorganic neutral detergent builders, or water-soluble organic detergent builders, or mixtures thereof.

4,028,284

PHENOLIC CHELATE RESIN

Masahide Hirai, Uji; Mikio Fujimura, Kamo; Masahiro Kazigase, and Minoru Saito, both of Uji, all of Japan, assignors to Unitika Ltd., Amagasaki, Japan

Continuation-in-part of Ser. No. 435,126, Jan. 21, 1974, Pat. No. 3,936,399. This application Sept. 11, 1975, Ser. No. 612,523

Claims priority, application Japan, Jan. 23, 1973, 48-9793

The portion of the term of this patent subsequent to Feb. 3, 1993, has been disclaimed.

Int. Cl.² C08G *14/06*; C08J *5/20*

U.S. Cl. 260—2.2 C 7 Claims

1. A high adsorption capacity phenolic chelate resin consisting of a heavy metal-adsorbing phenolic chelate resin having an adsorbability to a heavy metal in the proportion of at least 1.2 milliequivalents per g. of dried terminal Na type resin, said phenolic chelate resin being prepared from at least one phenol, at least one aldehyde and iminodiacetic acid, said iminodiacetic acid being used in the ratio of more than 0.2 based on the total phenol.

4,028,285

STYRENE POLYMER FOAMS HAVING REDUCED FLAMMABILITY CONTAINING ALLYL ETHER SYNERGISTS

Walter Oscar Pillar, Monroeville, Pa., assignor to ARCO Polymers, Inc., Philadelphia, Pa.

Filed Nov. 24, 1976, Ser. No. 744,578

Int. Cl.² C08K *5/02*, *5/06*

U.S. Cl. 260—2.5 FP 4 Claims

1. A foamed styrene polymer composition consisting essentially of a styrene polymer foam, 0.2 to 3.0 percent by weight of polymer of a flame retardant selected from the group consisting of halogenated aliphatic compounds, halogenated cycloaliphatic compounds, and halogenated araliphatic compounds, said flame retardants being halogenated only in the aliphatic portion of the molecules, and 0.25 to 0.75 percent by weight of an allyl ether selected from the group consisting of allyl phenyl ether and tetraallyloxy propane.

4,028,286

INK TRANSFER MEMBER

Joseph Dominic Neri, Colorado Springs, Colo., and John Lewis Williams, Rochester, N.Y., assignors to Burroughs Corporation, Detroit, Mich.

Filed June 30, 1975, Ser. No. 591,856

Int. Cl.² C08J *9/00*

U.S. Cl. 260—2.5 P 11 Claims

1. In an ink releasing member of the plastisol matrix type in which a liquid ink is suspended within the pores of the matrix the improvement wherein a liquid polyglycol of low vapor pressure at the fusion temperature of the plastisol, low viscosity at ambient temperature, substantial insolubility in water, substantially non-hygroscopic and effective as a dispersant for colorant materials is used as the vehicle for the liquid ink, said polyglycol having a molecular weight substantially in the range of 1000 to 5000 and being selected from a group consisting of polypropylene glycol and triols of ethylene and propylene.

4,028,287

PROCESS FOR CONTINUOUS PREPARATION OF A FOAM POLYAMIDE

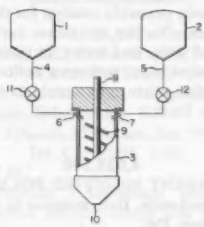
Shigetake Sato, Kamakura; Suminobu Kurahashi, Yokohama; Toru Okuyama, Yokohama, and Noboru Hamada, Yokohama, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 352,638, April 19, 1973, abandoned. This application June 4, 1975, Ser. No. 583,635

Claims priority, application Japan, Apr. 27, 1972, 47-42463; Apr. 27, 1972, 47-42466

Int. Cl.² C08J *9/02*

U.S. Cl. 260—2.5 N 17 Claims



1. A process for the preparation of a polyamide foam by ring-opening polymerization of a polymerizable lactam in the presence of a basic catalyst, a promoter and a foaming agent which comprises the steps of:

A. preparing a first composition containing the lactam and the catalyst at a temperature above the melting point of the lactam;

B. preparing a second liquid composition containing the promoter and the foaming agent at room temperature without heating and maintaining it at room temperature;

C. mixing said compositions at their preparation temperatures in a mixing vessel with violent agitation to initiate polymerization;

D. discharging the reacting mixture into a container before polymerization of the lactam is more than 10% complete, and allowing the polymerization to run to completion.

4,028,288

MOLDABLE END PRODUCTS FROM PRIMARILY RECLAIMABLE WASTE MATERIALS

James E. Turner, Southlake, Tex., assignor to Tire Recyclers International, Inc., Southlake, Tex.

Filed Feb. 3, 1976, Ser. No. 654,959

Int. Cl.² B29H *19/00*; B32B *5/00*

U.S. Cl. 260—2.3 7 Claims

1. A heat and pressure molded end product comprising a mixture of particalized rubber tires including the fibrous cord content thereof and a lesser amount of synthetic resin thermoplastic material bits, said end product comprising a substantially homogeneously incomplete reset mixture, including portions of a reset mixture of melted synthetic thermoplastic resin and rubber tire particles, and portions of said rubber tire particles, per se, in a bonded relationship, the porosity of said end product being substantially proportional to the ratio of said rubber tire particles to said synthetic thermoplastic resin material bits in said mixture.

5. The product of claim 4, with said particalized rubber tire material comprising, by weight, not less than 50 percent and not more than 80 percent of said mixture.

4,028,289

FOAMED POLYESTER RESIN

William F. Brown, Bonduel, Wis., assignor to Vast Products Inc., Bonduel, Wis.

Filed Oct. 5, 1976, Ser. No. 729,876
Int. Cl.² C08V 9/08
U.S. Cl. 260—2.5 N 8 Claims

1. The method of preparing objects of a foamed-filled polyester resin material which comprises (a) preparing a liquid resin blend comprised of a liquid polyester resin, an inorganic filler, bicarbonate of soda, and an effective amount of a cell stabilizing mixture containing sodium acetate, aluminum ammonium sulfate, ferrous ammonium sulfate and tannic acid; (b) preparing a catalyst blend comprised of an effective amount of an organic peroxide catalyst for the polyester resin, an acidic substance effective to release carbon dioxide from the bicarbonate of soda, and water; (c) combining the resin blend and the catalyst blend to form a uniform liquid mixture; and (d) applying that mixture to a mold or surface and allowing the mixture to foam.

4,028,290

HIGHLY ABSORBENT MODIFIED POLYSACCHARIDES

Albert R. Reid, Hockessin, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Oct. 23, 1975, Ser. No. 625,332
Int. Cl.² C08L 1/02
U.S. Cl. 260—17.4 GC 8 Claims

1. A method of preparing a modified polysaccharide which exhibits high absorbency for water and salt solutions, which method comprises reacting a water-insoluble, water-swellable polysaccharide simultaneously with acrylamide, at least one other water-soluble monoolefinic vinyl monomer which, in the absence of the polysaccharide, is copolymerizable with acrylamide to form a water-soluble copolymer, and a water-soluble copolymer, and a water-soluble free radical polymerizable divinyl monomer, in the presence of a free radical catalyst system, said reaction being carried out in a reaction medium comprising a substantially water-immiscible inert aromatic hydrocarbon having dispersed therein water equal to about 1.5 to 2.5 times the weight of the aforesaid reactants and a low boiling, water-miscible, organic liquid selected from the class consisting of acetone and isopropyl alcohol, in an amount equal to about 25 to 65% of the volume of the aromatic hydrocarbon.

4,028,291

PROCESS FOR THE PRODUCTION OF RESINS FOR PRINTING INK

Shozo Tsuchiya, Kawasaki; Hisatake Sato, Yokohama; Akio Oshima, Yokohama, and Hideo Hayashi, Yokohama, all of Japan, assignors to Nippon Oil Company Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 434,140, Jan. 17, 1974, abandoned. This application Sept. 29, 1975, Ser. No. 617,486
Claims priority, application Japan, Jan. 23, 1973, 48-9137
Int. Cl.² C08L 91/00
U.S. Cl. 260—23.7 C 7 Claims

1. A process for the production of resins for offset printing ink comprising reacting an intermediary resin obtained by heat polymerizing, in the absence of a catalyst, at least one of cyclopentadiene, dicyclopentadiene and C_1 to C_3 alkyl substituted derivatives thereof and an unsaturated alcohol or unsaturated alcohol ester of organic acid wherein said unsaturated alcohol is a monoethylenically unsaturated monohydric alcohol of 3 to 22 carbon atoms and said unsaturated alcohol ester of organic acid is an ester of monoethylenically unsaturated monohydric alcohol of 2 to 22 carbon atoms with aliphatic or aromatic organic acid of 2 to 22 carbon atoms, at a temperature of 150° to 350° C. in the presence or in the absence of an inert hydrocarbon solvent, wherein the hydroxyl value of said intermediary resin is 30–300, with a higher monohydric saturated fatty acid or higher monohydric unsaturated fatty acid or their mixtures at a temperature ranging from 180°–280° C. to form the corresponding ester by esterification or ester-exchange to produce a resin having a softening point of 100° C or more wherein the amount of said higher monohydric saturated fatty acid or higher monohydric unsaturated fatty acid or their mixtures used is 0.2–1.1 moles for every mole of the hydroxyl amount determined from the hydroxyl value of said intermediary resin.

4,028,292

HOT MELT ADHESIVE

Ralf Korpman, Somerville, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed May 23, 1974, Ser. No. 472,791
Int. Cl.² C08L 91/00
U.S. Cl. 260—27 R 5 Claims

1. A thermoplastic hot melt pressure-sensitive adhesive composition which comprises an elastomeric component comprising a major amount by weight of said component of a linear or radial elastomeric and thermoplastic A-B-A block copolymer wherein B is an elastomeric polymer block derived from a conjugated diene and A is a thermoplastic polymer block derived from styrene or a styrene homologue and said A blocks constitute about 10–50 percent by weight of the block copolymer; about 125–300 parts by weight of the elastomeric component of a tackifying component consisting essentially of a blend of normally solid and liquid tackifier resins, the proportion of solid resin to liquid resin in the blend being between about 4 to 1 and 1 to 3, said solid resins being normally friable at about 25° C. and said liquid resins being in a liquid state at about 25° C.; and an essentially non-catalyzed heat stabilizing component comprising about 1-5 percent by weight of the adhesive composition of an oil-soluble heat-reactive phenol formaldehyde resin and at least about 0.5 percent by weight of the composition of an antioxidant therefor.

4,028,293

METHOD FOR PREPARING MATERIALS CONTAINING MINERALS AND SYNTHETIC SUBSTANCES, MATERIALS MANUFACTURED ACCORDING TO SAID METHOD AND OBJECTS CONSISTING OF SAID MATERIALS

Antoon J. van den Berg, Epe, Netherlands, assignor to Hollandsche Wegenbouw Zanen B.V. and Olster Asphalt Fabriek B.V., both of, Netherlands

Filed Sept. 29, 1975, Ser. No. 617,625
Claims priority, application Netherlands, Apr. 19, 1973, 7305619
Int. Cl.² C08L 23/06, 95/00
U.S. Cl. 260—28.5 AS 5 Claims

1. A method of preparing a material consisting essentially of a mineral component, a polymeric component, and bitumen, said method comprising sequentially

1. heating a mineral component to a temperature of at least 180° C;
2. mixing with the heated mineral component of (1) a thermoplastic polymeric component, said polymeric component being in diminutive form and in an amount of 2 to 30% by weight, calculated on the amount by weight of the mineral component;
3. mixing with said mixture of (2) the bitumen which has been previously heated, said heated bitumen being used in an amount of 40% to 60% by weight, calculated on the amount by weight of said polymeric component; and
4. allowing the material product of (3) to cool.

4,028,294

EPOXY MODIFIED ACRYLIC LATICES AND METHOD OF PRODUCING SAME

George L. Brown, Scotch Plains, and Michael A. Tobias, Somerville, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,610
Int. Cl.² C08L 33/02
U.S. Cl. 260—29.6 NR 7 Claims

1. A method of producing a thermosetting aqueous latex comprising dissolving a polyepoxide which is a diglycidyl ether of a bisphenol having a molecular weight in the range of 350–4000 into at least one of the monoethylenically unsaturated monomers to be polymerized, said monomers including from 2 to 30% of monoethylenic carboxylic acid, and the balance of said monomers consisting essentially of nonreactive monoethylenic monomers, emulsifying said monomers and polyepoxide in water with the aid of from 0.25–3 parts of surfactant per 100 parts of said monomers, polymerizing said monomers in said aqueous emulsion with the aid of a free radical polymerization catalyst and at a temperature below which said carboxylic acid will react with the epoxy groups of said polyepoxide, the relative proportion of said polyepoxide and said carboxylic acid monomer varying from about a stoichiometrically equivalent amount up to a 50% equivalent excess of said carboxylic acid monomer, and adding ammonia to said latex to provide a pH of 7.0–9.0 to stabilize the latex and catalyze the cure thereof.

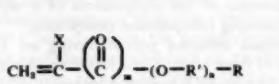
4,028,295

HYDROPHILIC POLYMER AND CONTACT LENS

Samuel Loshaek, Chicago, Ill., assignor to Wesley-Jessen Inc., Chicago, Ill.

Filed Jan. 8, 1976, Ser. No. 647,634
Int. Cl.² C08F 220/20; C08L 31/02; G02B 3/00
U.S. Cl. 260—29.6 H 8 Claims

1. A contact lens consisting essentially of hydrated polymer consisting essentially of, for each 100% by weight, about 70 to 90% by weight of a hydroxy C_2–C_4 alkyl monoester of acrylic or methacrylic acid containing less than 0.1% by weight of a diester and 10 to 30% by weight of a comonomer having the general formula:



wherein R is a C_1 to C_4 straight or branched chain alkoxy group, R′ is a C_2 to C_3 straight or branched chain alkylene group, X is hydrogen or a methyl group, m is 0, and n is 1 or 2, said polymer having a water content of about 25 to 40% by weight, a linear swelling index of about 10 to 18%, and a Shore A hardness of about 20 to 65.

4,028,296

SOLID, RAPID-SETTING, RIGID POLYURETHANES

Franciszek Olstowski, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 573,704, May 1, 1975, Pat. No. 3,983,065, which is a division of Ser. No. 405,244, Oct. 10, 1973, Pat. No. 4,001,166, which is a continuation-in-part of Ser. No. 327,630, Jan. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 221,784, Jan. 28, 1972, abandoned. This application May 27, 1976, Ser. No. 690,461
The portion of the term of this patent subsequent to Sept. 28, 1993, has been disclaimed.
Int. Cl.² C08K 5/15
U.S. Cl. 260—30.4 N 14 Claims

1. A rigid, non-cellular, solid composition having a density of at least 1 g/cc, a percent elongation of less than 100 and which is demoldable within about 5 minutes, without the application of an external source of heat, after admixture of the components of a rapid-setting polyurethane-forming composition, free of catalytic quantities of a catalyst for urethane formation, and comprising

A. an amine initiated polyol having an OH equivalent weight of from about 50 to less than about 250;

B. an organic aromatic polyisocyanate;

C. a liquid modifier compound having a boiling point above about 150° C selected from the group consisting of cyclic ethers and mixtures thereof; and

wherein components (A) and (B) are present in quantities such that the NCO:OH ratio is from about 0.8:1 to about 1.5:1 and component (C) is employed in quantities of from about 5% to about 60% by weight of the combined weight of components (A), (B) and (C).

4,028,297

NOVEL FLAME RETARDANT POLYCARBONATE COMPOSITIONS

Jimmy L. Webb, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed July 18, 1975, Ser. No. 597,006
Int. Cl.² C08K 3/30
U.S. Cl. 260—37 PC 10 Claims

1. A polycarbonate composition comprising a non-halogenated aromatic polycarbonate and a flame retardant additive selected from an alkali or alkaline earth metal salt of an inorganic sulfite, thiosulfate, dithionite, or pyrosulfite and mixtures thereof.

4,028,298

ORGANOSILICON COMPOSITIONS PARTICULARLY SUITABLE FOR THE NON-STICK, RUB-RESISTANT TREATMENT OF CELLULOSIC AND SYNTHETIC MATERIALS

Jean Dumoulin, Ste Croix-en-Jarex, and Parasko Nicou, Francheville-le-Haut, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Aug. 29, 1975, Ser. No. 608,977
Claims priority, application France, July 17, 1975, 75.22336
Int. Cl.² C08L 43/04
U.S. Cl. 260—29.1 SB 8 Claims

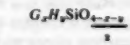
1. An organosilicon composition which contains the following:

A. 100 parts by weight of a polymer mixture which is selected from:

i. a mixture containing about 60 to 100% by weight of a diorganopolysiloxane polymer with terminal hydroxyl groups (a), having a viscosity at least about 10 cPo at 25° C, and about 40 to 0% by weight of a diorganopolysiloxane oil (b) blocked at one chain end of their chain by a triorganosiloxyl unit and at the other end by a triorganosiloxyl unit or a hydroxyl group, having a viscosity from about 5 cPo to about 500 cPo at 25° C, and

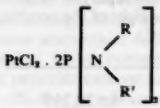
(ii) a mixture containing about 30 to 90% by weight of a diorganopolysiloxane polymer (a) as defined above and about 70 to 10% by weight of a diorganopolysiloxane rubber (c) blocked at each chain end by a triorganosiloxyl unit, having a viscosity of at least about 1 million cPo at 25° C, the organic radicals linked to the silicon atoms of the said diorganopolysiloxanes described under (i) and (ii) being selected from methyl, vinyl, ethyl and n-propyl radicals such that at least about 80% of them are methyl radicals and at most about 3% of them are vinyl radicals and such that there is only a single vinyl radical linked to a silicon atom;

B. about 1 to 15 parts by weight of an organohydrogenopolysiloxane polymer (d) corresponding to the general formula:



in which the symbol G represents a methyl, ethyl or n-propyl radical such that at least about 80% of the G radicals are methyl radicals, the symbol x represents a number from 1 to 1.99 and the symbol y represents a number from 0.1 to 1, the sum $x + y$ being from 1.7 to 2.6, and the viscosity being from about 2 cPo to about 4,000 cPo at 25° C;

C. about 0.001 to 0.1 part by weight of platinum in the form of a platinous chloride phosphorus derivative complex of the general formula:



in which the symbols R and R′, which may be identical or different, each represents a monovalent hydrocarbon radical having from 1 to 8 carbon atoms, or two of these radicals, together with the nitrogen atom to which they are attached, form a monovalent heterocyclic radical.

4,028,299

SOLID, RAPID-SETTING, RIGID POLYURETHANES

Franciszek Olstowski, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 574,158, May 2, 1975, Pat. No. 3,983,066, which is a division of Ser. No. 405,244, Oct. 10, 1973, Pat. No. 4,001,166, which is a continuation-in-part of Ser. No. 327,630, Jan. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 221,784, Jan. 28, 1972, abandoned. This application May 27, 1976, Ser. No. 690,761 The portion of the term of this patent subsequent to Sept. 28, 1993, has been disclaimed.

Int. Cl.² C08K *5/15*

U.S. Cl. 260—30.4 N **14 Claims**

1. A rigid, non-cellular, solid composition having a density of at least 1 g/cc, a percent elongation of less than 100 and which is demoldable within about 5 minutes, without the application of an external source of heat, after admixture of the components of a rapid-setting polyurethane-forming composition free of catalytic quantities of a catalyst for urethane formation and comprising

A. an amine initiated polyol having an OH equivalent weight of from about 50 to less than about 250;

B. an organic aromatic polyisocyanate;

C. a liquid modifier compound having a boiling point above about 150° C selected from the group consisting of organic carbonates and mixtures thereof; and

wherein components (A) and (B) are present in quantities such that the NCO:OH ratio is from about 0.8:1 to about 1.5:1 and component (C) is employed in quantities of from about 5% to about 60% by weight of the combined weight of components (A), (B) and (C).

4,028,300

COATING COMPOSITION

Shigeo Wake, and Mikio Futagami, both of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Sept. 12, 1975, Ser. No. 613,035

Claims priority, application Japan, Sept. 13, 1974, 49-106532

Int. Cl.² C08K *5/01, 5/06, 5/07, 5/09*

U.S. Cl. 260—31.2 R **6 Claims**

1. A coating composition comprises

A. silicon compounds partial hydrolyzates comprising at least one partial hydrolyzate of a tetraalkoxysilane and at least one partial hydrolyzate of an organic silicon compound of the formula: $R_nSi(OR')_{4-n}$ wherein R is a hydrocarbon group having 1 to 6 carbon atoms, R′ is an alkyl group having 1 to 4 carbon atoms and n is 1 or 2, wherein said partial hydrolyzate of the organic silicon compound of the formula: $R_nSi(OR')_{4-n}$ is contained in an amount of 10 to 100 parts by weight (calculated as $R_nSiO_{4-n/2}$) to 100 parts by weight (calculated as SiO_2) of said partial hydrolyzate of the tetraalkoxysilane,

B. an acrylic copolymer which is a copolymer of an alkyl acrylate and/or an alkyl methacrylate and a hydroxyalkyl acrylate and/or a hydroxyalkyl methacrylate, wherein the ratio of alkyl (metha)acrylate and the hydroxyalkyl (metha)-acrylate is in the range of 1/10 to 10/1 by weight and said acrylic copolymer is contained in an amount of 5 to 200 parts by weight to 100 parts by weight (calculated as SiO_2) of said partial hydrolyzate of the tetraalkoxysilicon, and

C. an etherated methylolmelamine, which is contained in an amount of 0 to 150 parts by weight to 100 parts by weight (calculated as SiO_2) of said partial hydrolyzate of the tetraalkoxysilicon, which are dissolved in a solvent selected from the group consisting of an alcohol, a ketone, an ester, an ether, a cellosolve, a halide compound, a carboxylic acid, an aromatic compound and a mixture thereof.

4,028,301

SOLID, RAPID-SETTING, RIGID POLYURETHANES

Franciszek Olstowski, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 573,718, May 1, 1975, Pat. No. 3,966,664, which is a division of Ser. No. 405,244, Oct. 10, 1973, Pat. No. 4,001,166, and a continuation-in-part of Ser. No. 327,630, Jan. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 221,784, Jan. 28, 1972, abandoned. This application May 17, 1976, Ser. No. 687,427 The portion of the term of this patent subsequent to June 29, 1993, has been disclaimed.

Int. Cl.² C08K *5/10*

U.S. Cl. 260—31.4 R **12 Claims**

1. A rigid, non-cellular, solid composition having a density of at least 1 g/cc, a percent elongation of less than 100 and which is demoldable within about 5 minutes, without the application of an external source of heat, after admixture in the absence of a catalytic quantity of a catalyst for urethane formation and also in the absence of a chemically hindered aromatic diamine of the components of a rapid-setting polyurethane-forming composition comprising

A. an amine initiated polyol having an OH equivalent weight of from about 50 to less than about 250 and from about 3 to about 8 hydroxyl groups;

B. an organic aromatic polyisocyanate;

C. a liquid modifier compound having a boiling point above about 150° C selected from the group consisting of ester-modified polyoxyalkylene compounds having an average hydroxyl equivalent weight above about 700 when such compounds contain 2 hydroxyl groups, an average hydroxyl equivalent weight above about 500 when such compounds contain 3 or more hydroxyl groups and an average molecular weight above about 700 when such compounds contain zero or 1 hydroxyl group and mixtures thereof; and wherein components (A) and (B) are present in quantities such that the NCO:OH ratio is from about 0.8:1 about 1.5:1 and component (C) is employed in quantities of from about 5% to about 60% by weight of the combined weight of components (A), (B) and (C).

4,028,302

PROCESS FOR PREPARING CONCENTRATED ACRYLONITRILE POLYMER SOLUTIONS

Daniel Gregory Tynan, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 7, 1975, Ser. No. 620,422

Int. Cl.³ C08K *5/07, 5/36*

U.S. Cl. 260—32.6 N **4 Claims**

1. In the preparation of acrylonitrile polymer solutions from polymer powder and an organic solvent selected from the

group consisting of dimethylformamide, dimethylacetamide, dimethylsulfoxide and tetramethylenesulfone in a twin-screw machine having temperature-control jackets for providing a cool zone followed by a heated zone; the process for preparing concentrated, clear, bubble-free, acrylonitrile polymer solutions of satisfactory color which comprises continuously feeding the powdered polymer into the cool zone of the twin-screw machine, injecting the organic solvent in a subsequent part of the cool zone at a rate of one to two parts solvent per one part of polymer, mixing the polymer and solvent to form a slurry at a temperature below 40°C., continuously advancing the slurry to the heated zone of the machine, advancing the slurry through a zone of reduced pressure and removing gas released from the slurry, heating the slurry at 110° to 150°C. while intermittently squeezing the slurry in directions transverse to the axes of the screws to provide sharply accelerated flow in directions of the axes, continuing the heating and intermittent squeezing to form a solution at 110° to 150°C., and finally discharging the solution from the machine.

4,028,303

SOLID, RAPID-SETTING, RIGID POLYURETHANES

Franciszek Olstowski, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 574,156, May 2, 1975, Pat. No. 3,983,068, which is a division of Ser. No. 405,244, Oct. 10, 1973, Pat. No. 4,001,166, which is a continuation-in-part of Ser. No. 327,630, Jan. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 221,789, Jan. 28, 1972, abandoned. This application May 28, 1976, Ser. No. 691,253

Int. Cl.² C08K *5/06*

U.S. Cl. 260—33.2 R **13 Claims**

1. A rigid, non-cellular, solid composition having a density of at least 1 g/cc, a percent elongation of less than 100 and which is demoldable within about 5 minutes, without the application of an external source of heat, after admixture of the components of a rapid-setting polyurethane-forming composition free of catalytic quantities of a catalyst for urethane formation and comprising

A. an amine initiated polyol having an OH equivalent weight of from about 50 to less than about 250;

B. an organic aromatic polyisocyanate;

C. a liquid modifier compound having a boiling point above about 150° C selected from the group consisting of

1. a liquid partially capped, block or randomly formed polyoxyalkylene compound represented by the general formula

$$R\text{-}(O\text{-}CH_2\text{-}CH(R_1)\text{-})_{x_1}(O\text{-}CH_2\text{-}CH(R_2)\text{-})_{x_2} \ldots (O\text{-}CH_2\text{-}CH(R_n)\text{-})_{x_n}OH$$

wherein each R is independently selected from saturated and unsaturated hydrocarbon groups having from about 1 to about 6 carbon atoms; R_1, R_2, . . . and R_n are independently hydrogen, an aryl group, an alkyl group or haloalkyl group, said alkyl or haloalkyl group having from about 1 to about 2 carbon atoms with the proviso that when R_1, R_2, . . . R_n is a haloalkyl group, it is present in a ratio of from about 0 to about 10 percent of the total R_1, R_2, . . . R_n groups, and x_1, X_2, . . . x_n are integers, the sum of which provides the partially capped polyoxyalkylene compound with a molecular weight of at least about 700;

2. a liquid, block or randomly formed polyoxyalkylene glycol represented by the general formula

$$H\text{-}(O\text{-}CH_2\text{-}CH(R_1)\text{-})_{x_1}(O\text{-}CH_2\text{-}CH(R_2)\text{-})_{x_2} \ldots (O\text{-}CH_2\text{-}CH(R_n)\text{-})_{x_n}OH$$

wherein R_1, R_2, . . . R_n are as defined in formula I above and x_1, x_2, . . . x_n are integers, the sum of which provides the polyoxyalkylene glycol with an equivalent weight of at least about 700;

3. a liquid, random or block polyoxyalkylene polyol having a hydroxyl functionality of from 3 to about 8 represented by the general formula

$$Z\text{-}(O\text{-}CH_2\text{-}CH(R_1)\text{-})_{x_1}(O\text{-}CH_2\text{-}CH(R_2)\text{-})_{x_2} \ldots (O\text{-}CH_2\text{-}CH(R_n)\text{-})_{x_n}OH)_q$$

wherein R_1, R_2, . . . R_n are as defined in formula I above, Z is the residue of an initiator compound having from 3 to about 8 hydroxyl groups, x_1, x_2, . . . x_n are integers, the sum of which provides the polyoxyalkylene polyol with a hydroxyl equivalent weight of at least about 500 and q is an integer having a value of from 3 to about 8; and

4. mixtures thereof; and

wherein components (A) and (B) are present in quantities such that the NCO:OH ratio is from about 0.8:1 to about 1.5:1 and component (C) is employed in quantities of from about 5% to about 60% by weight of the combined weight of components (A), (B) and (C).

4,028,304

SOLID, RAPID-SETTING, RIGID POLYURETHANES

Franciszek Olstowski, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 573,679, May 1, 1975, Pat. No. 3,983,069, which is a division of Ser. No. 405,244, Oct. 10, 1973, Pat. No. 4,001,166, which is a continuation-in-part of Ser. No. 327,630, Jan. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 221,784, Jan. 28, 1972, abandoned. This application May 27, 1976, Ser. No. 690,459 The portion of the term of this patent subsequent to Sept. 28, 1993, has been disclaimed.

Int. Cl.² C08K *5/02*

U.S. Cl. 260—33.8 UB **13 Claims**

1. A rigid, non-cellular, solid composition having a density of at least 1 g/cc, a percent elongation of less than 100 and which is demoldable within about 5 minutes, without the application of an external source of heat, after admixture of the components of a rapid-setting polyurethane-forming composition, free of catalytic quantities of a catalyst for urethane formation, and comprising

A. an amine initiated polyol having an OH equivalent weight of from about 50 to less than about 250;

B. an organic aromatic polyisocyanate;

C. a liquid modifier compound having a boiling point above about 150° C selected from the group consisting of chlorinated aliphatic compounds and mixtures thereof; and

wherein components (A) and (B) are present in quantities such that the NCO:OH ratio is from about 0.8:1 to about 1.5:1 and component (C) is employed in quantities of from about 5% to about 60% by weight of the combined weight of components (A), (B) and (C).

4,028,305

VULCANIZABLE ELASTOMERS DERIVED FROM THIODIETHANOL

Tsi Tieh Li, Milltown, and Robert Saxon, Princeton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 534,545, Dec. 19, 1974, abandoned. This application Oct. 31, 1975, Ser. No. 627,648

Int. Cl.² C08G *63/54, 63/68*

U.S. Cl. 260—75 S **4 Claims**

1. A vulcanizable elastomeric composition comprising the polymeric condensation reaction product of 80 to 90 mole percent of a mixture of thiodiethanol and one or more aliphatic or cycloaliphatic diols and, correspondingly, from 20 to 10 mole percent of an aromatic or cycloaliphatic dicarboxylic acid wherein at least 50 mole percent of the diol content is thiodiethanol and from about 1 to 10 mole percent of the diol content is a diol which provides an allylic double bond in a group pendant from the polymeric chain, said reaction product having a Mooney value of about 20 to 60.

4,028,306

UREA OR CARBONAMIDE CONTAINING DIISOCYANATE POLYADDITION PRODUCTS WITH PHOSPHORIC ESTER SUBSTITUENTS

Kuno Wagner, Leverkusen-Steinbuechel, and Manfred Hajek, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

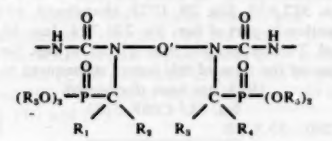
Filed June 2, 1975, Ser. No. 583,133

Claims priority, application Germany, June 5, 1974, 2427090

Int. Cl.² C08G *18/73*

U.S. Cl. 260—75 NT **23 Claims**

1. Linear, film-forming diisocyanate polyaddition products soluble in lacquer solvents, wherein they contain from 10 to 69% by weight of structural units corresponding to the formula



wherein

Q' represents a divalent C_2–C_{18} alkyl radical, C_4–C_{13} cycloalkyl radical, C_7–C_{11} aralkyl radical or C_6–C_{14} aryl radical optionally interrupted by oxygen, sulphur or nitrogen and optionally substituted by a C_1–C_8 alkyl radical, $-N(R_6)_2$, [R_6 = C_1–C_8 alkyl radical, C_6–C_{10} cycloalkyl radical, C_7–C_{11} aralkyl radical], NO_2- and/or halogen atoms,

R_1 and R_2 are the same or different and represent hydrogen, a C_1–C_{18} alkyl radical, C_6–C_{10} cycloalkyl radical or a C_6–C_{10} aryl radical,

R_3 and R_4 are the same or different and represent hydrogen, a C_1–C_{18} alkyl radical, C_6–C_{10} cycloalkyl radical, C_6–C_{10} aryl radical, in addition to which

R_1 and R_2 or R_3 and R_4 together with the carbon atom between nitrogen and phosphorus may form a 5- to 7-membered isocyclic ring, and

R_5 represents a C_1–C_4 alkyl, cyclohexyl or phenyl radical.

4,028,307

PREPARATION OF POLYESTERS USING SALTS OF SUBSTITUTED QUATERNARY AMMONIUM BASES

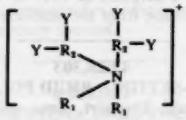
George R. Ure, Charlotte, N.C., assignor to Fiber Industries, Inc., Charlotte, N.C.

Continuation of Ser. No. 474,644, May 30, 1975, abandoned. This application Oct. 16, 1975, Ser. No. 623,174

Int. Cl.² C08G *63/14, 63/18, 63/38*

U.S. Cl. 260—75 R **3 Claims**

1. In a continuous process for the production of polyethylene terephthalate by direct esterification of ethylene glycol and terephthalic acid, the improvement comprising the continuous addition to an esterification reactor, maintained at a temperature of from 200°0 C. to 300° C., of a carboxylic acid salt of a quaternary ammonium base, wherein the cation may be represented by the general formula:



wherein R_1 is a monovalent group or radical independently selected from the group consisting of alkyl, cycloalkyl, aralkyl, alkaryl and aryl, R_2 is a trivalent group or radical independently selected from the group consisting of alkyl, cycloalkyl, aralkyl, alkaryl and aryl, and Y is a member selected from the group consisting of hydrogen and hydroxyl, at least one Y being hydroxyl.

4,028,308

POLY(CYCLOHEXANEDIMETHYLENE DIBROMOTEREPHTHALATE)

James P. Nelson, Woodridge, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Division of Ser. No. 455,588, March 28, 1974, abandoned, which is a continuation-in-part of Ser. No. 263,196, June 15, 1972, abandoned. This application Aug. 21, 1975, Ser. No. 606,503

Int. Cl.² C08G *63/18, 63/68*

U.S. Cl. 260—75 H **3 Claims**

1. A fire-retardant polyester consisting essentially of a dicarboxylic acid component and 1,4-cyclohexanedimethanol component wherein the dicarboxylic acid component comprises from 15 to 100 mole percent 2,5-dibromoterephthalic acid moieties and correspondingly 85 to 0 mole percent terephthalic acid moieties.

4,028,309

COATING COMPOSITIONS CONTAINING ESTERS OF DIBASIC ACIDS, GLYCOLS AND GLYCIDYL ESTERS, AND POLYISOCYANATES

James C. Fang, Media, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

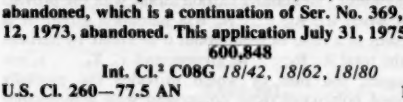
Continuation-in-part of Ser. No. 557,579, March 12, 1975, abandoned, which is a continuation of Ser. No. 369,175, June 12, 1973, abandoned. This application July 31, 1975, Ser. No. 600,848

Int. Cl.² C08G *18/42, 18/62, 18/80*

U.S. Cl. 260—77.5 AN **17 Claims**

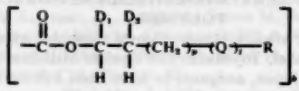
1. A composition comprising the reaction product of

A. a compound selected from the group consisting of:

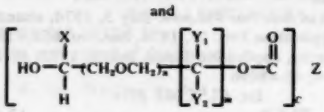


(1)

-continued



and



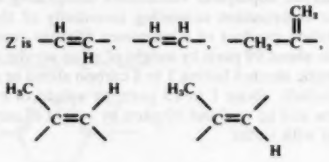
(2)

where,

in either structure,

X is hydrogen, an alkyl radical of 1–4 carbon atoms or phenyl;

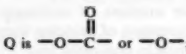
Y_1 and Y_2 can be the same or different and are hydrogen, $-CH_2OH$ or an alkyl radical of 1–4 carbon atoms;



where A is hydrogen or —COOH for the diester and a valence bond for the triester;

D_1 is hydrogen or $-CH_2OH$;

D_2 is hydrogen or —OH provided that one and only one of D_1 or D_2 must be —OH or $-CH_2OH$;



R is an alkyl radical of 4–18 carbon atoms, or a singly, doubly or triply unsaturated hydrocarbon radical of 17 carbon atoms;

a and *b* and 1 or 2, provided that $a + b$ is 2 or 3;

c is 2 or 3;

n is 0 or 1;

m is 1–5;

p is 0 or 1; and

t is 0 or 1;

and

B. a polyfunctional isocyanate.

4,028,310

PROCESS FOR THE PRODUCTION OF POLYUREAS

Walter Schäfer; Kuno Wagner, both of Leverkusen, and Hans-Jürgen Müller, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 18, 1975, Ser. No. 597,043

Claims priority, application Germany, July 30, 1974, 2436740

Int. Cl.² C08G *18/06*

U.S. Cl. 260—77.5 CH **23 Claims**

1. A process for the production of polyureas by reacting organic polyisocyanates with diamines, optionally in the presence of other compounds with more than one isocyanate-reactive hydrogen atom per molecule wherein the NCO/NH molar ratio is between about 0.4:1 and 1.1:1 and the polyisocyanates used are polyisocyanates which have an NCO content of about 0.5 to 25% by weight, an acylated urea group (-CO-N-CO-NH-) content of about 0.5 to 50% by weight and a carbodiimide group (—N=C=N—) content of from about 0 to 25% by weight.

4,028,311

PROCESS FOR THE HYDROLYSIS OF POLY(IMINOIMIDAZOLIDINEDIONES) TO POLYPARABANIC ACIDS

Tad L. Patton, Baytown, Tex., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Feb. 2, 1976, Ser. No. 654,098

Int. Cl.² C08G *18/82, 18/06*

U.S. Cl. 260—77.5 R **22 Claims**

1. In the sulfuric acid hydrolysis of polymers containing repeating iminoimidazolidinedione units to polymers containing repeating parabanic acid groups, the improvement which comprises

contacting a polymer solution containing repeating iminoimidazolidinedione units with 0.5 to 0.8 moles of sulfuric acid and 1 to 20 moles of water for each mole of iminoimidazolidinedione group in said polymer solution

i. at a temperature of 80° to 110° C

ii. for a hydrolysis reaction time of 5 to 60 minutes

iii. while maintaining the polymer in solution

to cause a substantially complete hydrolysis to polymers containing said parabanic acid groups, and to form large, easily filtered crystals of by-product ammonium sulfate.

4,028,312

POLYURETHANES CROSSLINKED WITH OXAZOLINES

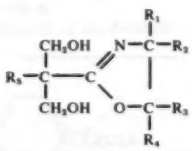
Clifford L. Ball, and Harry A. Smith, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 24, 1976, Ser. No. 689,300

Int. Cl.² C08G *18/06*

U.S. Cl. 260—77.5 AQ **8 Claims**

1. In a polyurethane prepared from polyols and polyisocyanates the improvement comprising employing as a crosslinker, chain extender or curing agent therefore an oxazoline or mixture of oxazolines represented by the formula



wherein each R_1, R_2, R_3, R_4 and R_5 are independently selected from the group consisting of hydrogen and hydrocarbon or halohydrocarbon radicals having from 1 to about 6 carbon atoms.

4,028,313

PROCESS FOR THE PRODUCTION OF WATER-DISPERSIBLE POLYHYDROXYL COMPOUNDS

Peter Müller; Kuno Wagner, and Richard Muller, all of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed June 15, 1976, Ser. No. 696,455

Claims priority, application Germany, June 25, 1975, 2528212; Dec. 16, 1975, 2556621

Int. Cl.² C08G *18/71, 18/14, 18/48*

U.S. Cl. 260—77.5 AP **11 Claims**

1. A process for the production of water-dispersible polyhydroxyl compounds comprising reacting from about 0.08 to 25% of the hydroxyl groups in an organic polyhydroxyl compound having a molecular weight of from about 400 to 10,000 or in a mixture of organic polyhydroxyl compounds having an

average molecular weight of from about 400 to 10,000, which are neither soluble nor dispersible in water, with a compound which contains at least one non-ionic hydrophilic group which contributes to the solubility or dispersibility of the reaction product in water and at least one group which reacts with hydroxyl groups in an addition reaction, the quantitative ratios and the functionality of the reactants in regard to said addition reaction being selected in such a manner that the products obtained by the process contain a statistical average of at least two free hydroxyl groups.

4,028,314
POLYLAURYLLACTAM HAVING A LOW FISHEYE GEL CONTENT

Rainer Feldmann, and Roland Feinauer, both of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

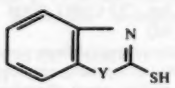
Filed Sept. 26, 1975, Ser. No. 617,147

Claims priority, application Germany, Oct. 9, 1974, 2448047

Int. Cl.² C08G *69/14, 69/16*

U.S. Cl. 260—78 L **10 Claims**

1. A film forming polyamide composition having a low fisheye gel content consisting essentially of about 98.5 to 99.99 percent by weight polylauryllactam and about 0.01 to 1.5 percent by weight of a compound of the general formula



wherein Y is a sulfur or oxygen atom or an NH-group.

4,028,315
SOLID PHASE SYNTHESIS OF PEPTIDES

Miklos Bodanszky, Shaker Heights, Ohio, and John Timothy Sheehan, Middlesex, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 81,531, Oct. 16, 1970, Pat. No. 3,743,628, which is a continuation-in-part of Ser. No. 829,127, May 29, 1969, abandoned, which is a continuation-in-part of Ser. No. 559,381, June 22, 1966, abandoned. This application Feb. 20, 1973, Ser. No. 333,918

Int. Cl.² C08G *69/44*

U.S. Cl. 260—78 A **6 Claims**

1. A process for bonding an amino acid to an insoluble hydroxymethyl polymer comprising esterifying the C-terminal carboxyl group of an N-terminal protected amino acid with the hydroxyl group of an insoluble hydroxymethyl polymer selected from the group consisting of hydroxymethylated copolymers of styrene and divinylbenzene, hydroxymethylcellulose, hydroxymethylated sulfonated polystyrene and polyvinylalcohol, the esterifying taking place at about room temperature in the presence of a condensing agent selected from the group consisting of dicylcohexylcarbodiimide, carbonyldiimidazole, thionyl chloride, phosphorous oxychloride, and ethoxyacetylene.

4,028,316
VULCANIZED ACRYLATE-ETHYLIDENE NORBORNENE POLYMERS

Tadao Matsuo; Minoru Miura; Satoshi Mashimo, all of Kobe; Masanori Kakei, Toyonaka, and Kyoichi Mishima, Nishinomiya, all of Japan, assignors to Mitsubishi Belting Limited, Kobe, Japan

Continuation of Ser. No. 485,660, July 3, 1974, abandoned. This application Feb. 17, 1976, Ser. No. 658,936

Claims priority, application Japan, July 5, 1973, 48-76206; Apr. 29, 1974, 49-48096

Int. Cl.² C08F *8/34*

U.S. Cl. 260—79.5 P **12 Claims**

1. An acrylic copolymer vulcanizate comprising an acrylic copolymer composition consisting essentially of the radical polymerization product of a monomer mixture consisting of about 85 to 99 parts by weight of an acrylic acid ester of an aliphatic alcohol having 1 to 8 carbon atoms or a mixture of said alcohols and about 1 to 15 parts by weight of ethylidene norbornene vulcanized with sulfur.

7. An acrylic copolymer vulcanizate comprising an acrylic copolymer composition consisting essentially of the radical polymerization product of a monomer mixture consisting of about 55 to about 99 parts by weight of an an acrylic acid ester of an aliphatic alcohol having 1 to 8 carbon atoms or a mixture of said alcohols, about 1 to 15 parts by weight of ethylidene norbornene and up to about 30 parts by weight of acrylonitrile vulcanized with sulfur.

4,028,317
REMOVAL OF PROTEINS FROM LIQUID ACID CHEESE WHEY

Pei K. Chang, Montrose, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed May 30, 1975, Ser. No. 582,488

Int. Cl.² A23J *1/20*

U.S. Cl. 260—112 R **7 Claims**

1. A process for removing proteins from liquid acid cheese whey which comprises:

a. adding to liqiud cheese whey at a temperature of about 10° to about 25° C. and at a pH of from about 6.0 to about 8.0 an effective amount of undissolved sodium lauryl sulfate for precipitation of proteins therefrom as a sodium lauryl sulfate-protein complex; and

b. adjusting the pH of the resulting mixture to from about 2.0 and about 5.0 to accomplish said precipitation.

4,028,318
CHROMOGENIC ENZYME SUBSTRATES

Leif Erik Aurell, Molndal, and Karl Göran Claeson, Saro, both of Sweden, assignors to A B Kabi, Stockholm, Sweden

Filed Nov. 14, 1975, Ser. No. 631,974

Claims priority, application Sweden, Dec. 5, 1974, 7415229

Int. Cl.² C07C *103/52*

U.S. Cl. 260—112.5 R **9 Claims**

1. New chromogenic substrates for serine proteases, specially suitable for diagnostic determination of factor Xa, which are represented by the following general formula:

$$R_1\text{-}A_1\text{-}A_2\text{-Gly-Arg-NH-}R_2$$

or its salts, where R_1 is selected from the group consisting of hydrogen, alkanoyl having from 1 to 12 carbon atoms, cyclohexylcarbonyl, benzoyl, benzoyl substituted with one or two halogen atoms, methylamine or phenyl groups, benzene sulphonyl and toluenesulphonyl; R_2 is selected from the group consisting of nitrophenyl, naphthyl, nitronaphthyl, methoxynaphthyl, quinolyl and nitroquinolyl; A_1 is selected from the group consisting of a single bond, and the amino acids selected from the group consisting of Gly, Ala, Val, Leu, Ileu, Pro, Met, Phe and Tyr; and A_2 is selected from the group consisting of the amino acids Glu, Gln, Asp, and Asn.

4,028,319
2 AND 3-SUBSTITUTED ENKEPHALINS

David A. Jones, Jr., Evanston; James M. Schlatter, Glenview; Richard A. Mikulec, Chicago; Judith A. Reuter, Skokie, and Robert H. Mazur, Deerfield, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

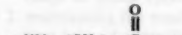
Filed May 7, 1976, Ser. No. 684,321
Int. Cl.² C07C *103/52*
U.S. Cl. 260—112.5 R 23 Claims

1. A compound of the formula

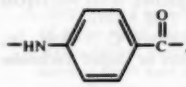
H—Tyr—W—Phe—Y—OH (I)

wherein Y is Leu or Met; W is selected from the group consisting of

—Aib—Gly—,
—Ala—Gly—,
—Sar—Gly—,
—Gly—Aib—,
—Gly—Ala—,
—Gly—Sar—,



and



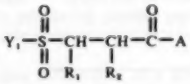
and the stereochemical configuration of each of the optically active amino acid residues is D, L or DL.

4,028,320
METHOD OF HARDENING GELATIN USING SULFONYL COMPOUNDS

Hidefumi Sera; Kameji Nagao, and Tsumoru Ishii, all of Minami-ashigara, Japan, assignors to Fujii Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Apr. 26, 1976, Ser. No. 680,416
Claims priority, application Japan, Apr. 25, 1975, 50-50500
Int. Cl.² C09H *7/00*
U.S. Cl. 260—117 8 Claims

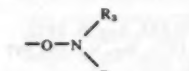
1. A method of hardening gelatin which comprises adding thereto a compound of the following general formula (I):



(I)

in which Y_1 is CH_2=CH—, $ClCH_2$—CH_2—, $BrCH_2$—CH_2—, CH_3COO—CH_2CH_2— or $ClCH_2COO$—CH_2CH_2—, R_1 and R_2 are H or CH_3, but both of them are not CH_3 at the same time, and A is one of the following groups:

(1) esters



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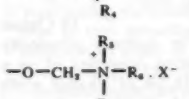

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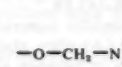

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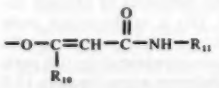
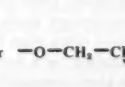


or



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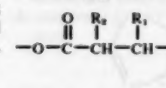
(2) Acid anhydrides

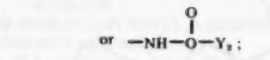


or

;

(3) Amides(imides)

or



;

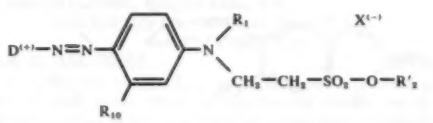
in which both R_3 and R_4 are acyl groups or at least one of them is an acyl group other than when R_3 and R_4 form a benzotriazole ring, and when one or R_3 and R_4 is an acyl group, the other is H or an alkyl group containing at most 4 carbon atoms; and wherein in any case, R_3 and R_4 may form a saturated or unsaturated carbocyclic or heterocyclic ring in combination with the nitrogen atom to which they are attached; R_5, R_6 and R_7 are alkyl groups containing at most 4 carbon atoms, and may form a saturated or unsaturated ring, or may form a bicyclo ring; X^- is an acid anion; R_8 and R_9 are a saturated or unsaturated carbocyclic or heterocyclic ring in combination with the nitrogen atom to which they are attached; R_{10} is an alkyl or aryl group containing at most 6 carbon atoms; R_{11} is an alkyl group containing at most 3 carbon atoms; R_{12} is an alkyl, aryl or aralkyl group containing at most 7 carbon atoms; and Y_2 is CH_2=CH—, $ClCH_2$—CH_2—, Br—CH_2—CH_2—, CH_3COO—CH_2CH_2—, or $ClCH_2COO$—CH_2CH_2—.

4,028,321
BASIC AZO AMINO-PHENYLENE DYESTUFFS

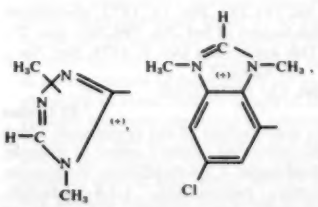
Erwin Fleckenstein, Hofheim, Taunus, and Peter Mischke, Neuenhain, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 23, 1974, Ser. No. 491,175
Claims priority, application Germany, July 27, 1973, 2338135
Int. Cl.² C09B *29/06, 29/08, 29/36, 43/00*
U.S. Cl. 260—146 R 4 Claims

1. A basic dyestuff of the formula



wherein R_1 is hydrogen, alkyl of 1 to 5 carbon atoms, hydroxyalkyl of 1 to 4 atoms, cyanoalkyl of 1 to 4 carbon atoms in the alkyl moiety or chloroalkyl of 1 to 4 carbon atoms, R'_2 is phenyl or naphthyl or is phenyl or naphthyl substituted by one or more of alkyl of 1 to 4 carbon atoms, alkoxy to 1 to 4 carbon atoms, nitro, cyano, and chlorine, D^+ is



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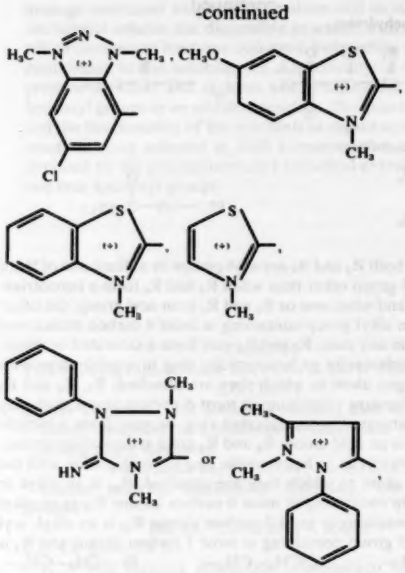


R_{10} is hydrogen, fluorine, bromine, chlorine, or alkyl of 1 to 4 carbon atoms X^- is an anion.

4,028,322

6-METHYLBENZIMIDAZOLONYLAZOBARBITURIC ACID PIGMENT

Rudolf Mory, Dornach, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

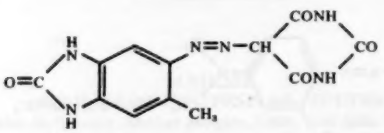
Continuation-in-part of Ser. No. 379,527, July 16, 1973, abandoned. This application Sept. 12, 1975, Ser. No. 612,591

Claims priority, application Switzerland, July 13, 1972, 10526/72

Int. Cl.² C09B *29/36;* **C09D** *11/00;* **D06P** *1/08, 3/00*

U.S. Cl. 260—154 **1 Claim**

1. The compound of the formula



4,028,323

PROCESS FOR MAKING AZO COMPOUNDS BY COUPLING WITH NITROSATED HETEROCYCLIC PRIMARY AMINES

Gert Hegar, Schoenenbuch, and Hans-Joerg Angliker, Basel, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 217,242, Jan. 12, 1972, abandoned, which is a continuation-in-part of Ser. No. 794,381, Jan. 27, 1969, abandoned. This application Oct. 8, 1975, Ser. No. 620,665

Int. Cl.² C09B *27/00*

U.S. Cl. 260—157 **10 Claims**

1. A process for the manufacture of azo compounds which comprises reacting the nitrosated primary amine of thiazole, benzthiazole, 1,3,4-thiadiazole, 1,2,4-thiadiazole, isothiazole, benzisothiazole, oxazole, benzoxazole, 1,3,4-oxadiazole, 1,2,4-oxadiazole, isoxazole, benzisoxazole, selenazole or benzselenazole which are unsubstituted or contain no other substituents than lower alkyl, phenyl, phenyl substituted by nitro, lower alkylthio, lower alkoxy, lower alkyl, chloro or bromo; benzyl cyclohexyl, cyano, thiacyano, chloro, bromo, lower alkylthio, lower alkoxy, lower alkylsulfonyl, nitro, lower alkoxycarbonyl, sulfonamide, N-lower alkyl sulfonamide, trifluoromethyl, phenylazo and lower alkanoyl, where lower means containing 1 to 7 carbon atoms, with, as an azo coupling component, aminobenzene which contains a member selected from the group consisting of lower alkyl and lower cyanoalkyl attached to the amino group and which is unsubstituted or substituted in the nucleus by a member selected from the group consisting of chlorine, bromine, lower alkyl, lower alkoxy and acylamino, wherein "lower" means containing at most 7 carbon atoms and "acyl" is lower alkanoyl, carbamoyl, N-lower alkyl carbamoyl or benzoyl in a weakly acid medium at a temperature of from room temperature to about 100° C.

4,028,324

HIGH TEMPERATURE SEAL MATERIAL AND METHOD FOR MANUFACTURING THE SAME

Jerome G. Tuschner, Enfield, and Richard C. Nickols, Jr., Glastonbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 16, 1975, Ser. No. 641,204

Int. Cl.² C08K *5/02;* **C10M** *5/18, 7/28*

U.S. Cl. 260—33.8 F **8 Claims**

1. An extruded seal material which, before use, consists essentially of:

a. 10–40% by weight fibrillating polytetrafluoroethylene;

b. 30–50% by weight halogenated oil having the characteristics that it is stable in phosphoric acid up to at least 400° F, has a low volatility up to at least 400° F, and is a liquid at room temperature through at least 400° F;

c. 0–5% by weight halogenated solvent; and

d. a balance of particulate filler material selected from the group consisting of non-fibrillating polytetrafluoroethylene, silicon carbide, and graphite, or combination thereof;

wherein said seal material is rope like in form, and the fibrils of polytetrafluoroethylene are substantially aligned in the direction of the axis of the rope.

4,028,325

COMPOSITE DENTAL MATERIAL AND METHOD OF PREPARING SAME

Alan G. King, 827 Chenook Trail, Macedonia, Ohio 44056, and Leon Levine, 94 Brewster Road, West Hartford, Conn. 06117

Continuation-in-part of Ser. No. 279,033, Aug. 9, 1972, abandoned. This application Mar. 7, 1975, Ser. No. 556,397

Int. Cl.² C08K *9/06, 3/22*

U.S. Cl. 260—42.15 **18 Claims**

1. A composite material for use in dentistry principally comprising: (A) silica glass composition consisting of on a weight basis of between about 7.0–18.0% of alkaline earth metal oxides in solution wherein said alkaline earth metal oxides are selected from the group consisting of calcium oxide, and magnesium oxide; and, (B) a methacrylate resin coupled to said silica glass by a silane mixture, said composite material including on a weight basis approximately 100 parts of said silica glass composition to between approximately 13.5 to 65 parts of said methacrylate resin.

4,028,326

PROCESS FOR PRODUCING POWDER PAINT PARTICLES FROM LIQUID PAINT I

Amos Golovoy, Inkster, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sept. 25, 1975, Ser. No. 616,526
Int. Cl.² C08J 3/12
U.S. Cl. 260—42.22 5 Claims

1. A process for producing powder paint particles from a liquid dispersion of organic paint components in an organic solvent which comprises:

1. depositing upon the surface of a stream of water in continuous movement through a spreading and extraction zone without strong agitation at the point of initial contact, a liquid dispersion of resincomprising organic paint components in an organic solvent that is miscible with water, has surface tension in the range of about 20 to about 40 dynes/cm. and contains between 10 and 40 weight percent paint components which will float together on and are less than 5 weight percent soluble in water, said resin having average molecular weight in the range of about 1500 to about 15,000,
2. maintaining the resultant floating deposit of paint dispersion in said spreading and extraction zone for a time sufficient to admit of
   A. spreading of said dispersion in contact with said stream of water upon the surface of said stream,
   B. extraction of at least 90 weight percent of said organic solvent from said dispersion of organic paint components floating upon the surface of said stream of water into said stream of water, and
   C. solidification of said organic paint components on said surface into plate-like solids,
3. breaking said plate-like solids into smaller particles after said plate-like solids have passed from said spreading and extraction zone into a collection zone, and
4. recovering said smaller particles from said collection zone.

4,028,327

PROCESS FOR PRODUCING POWDER PAINT PARTICLES FROM LIQUID PAINT II

Amos Golovoy, Inkster, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sept. 25, 1975, Ser. No. 616,527
Int. Cl.² C08J 3/12
U.S. Cl. 260—42.22 8 Claims

1. A process for producing powder particles from a liquid dispersion of organic paint components in an organic solvent which comprises:

1. depositing upon the surface of a stream of an aqueous saline solution containing between 1 and about 15 weight percent of a water-soluble salt in continuous movement through a spreading and extraction zone without strong agitation at the point of initial contact a liquid dispersion of resin comprising organic paint components in an organic solvent that is miscible with said saline solution, has surface tension in the range of about 20 to about 40 dynes/cm. and contains between 10 and 40 weight percent paint components which will float together on said saline solution, said resin having average molecular weight in the range of about 1500 to about 15,000,
2. maintaining the resultant floating deposit of paint dispersion in said spreading and extraction zone for a time sufficient to admit of
   A. spreading of said dispersion in contact with said saline solution upon the surface of said saline solution,
   B. extraction of at least 90 weight percent of said organic solvent from said dispersion of organic paint components floating upon the surface of said saline solution into said saline solution, and
   C. solidification of said organic paint components on said surface into plate-like solids,
3. breaking said plate-like solids into smaller particles after said plate-like solids have passed from said spreading and extraction zone into a collection zone, and
4. recovering said smaller particles from said collection zone.

4,028,328

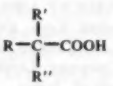
ELIMINATION OF PINKING IN VINYL ASBESTOS FORMULATIONS

Gerald Rubin, Edison, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Division of Ser. No. 431,892, Jan. 9, 1974, Pat. No. 3,931,076.
This application Sept. 5, 1975, Ser. No. 610,822
Int. Cl.² C08K 3/34, 5/09, 5/34
U.S. Cl. 260—42.44 8 Claims

1. A vinyl asbestos composition comprising:

a. a vinyl resin;
b. asbestos;
c. fillers;
d. melamine in an amount of from about 0.1 to about 2.5 weight percent; and
e. an antipinking agent, in an amount ranging from about 0.01 to about 15 weight percent, selected from the group consisting of zinc salts, calcium salts, isopropylamine salts and diethanolamine salts of trialkyl acetic acids having the formula



wherein R, R′ and R″ are alkyl groups having from C_1 to C_{10} carbon atoms.

4,028,329

PROCESS FOR THE BULK POLYMERIZATION OF VINYL HALIDE POLYMERS SHOWING REDUCED REACTOR SCALE FORMATION

Henry Kahn, Williamsville, and William L. Schall, Grand Island, both of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed July 24, 1974, Ser. No. 491,189
Int. Cl.² C08K 3/36
U.S. Cl. 260—42.53 14 Claims

1. In the process for the preparation of a vinyl halide polymer by bulk liquid phase polymerization carried out in the presence of an initiating amount of a free radical initiator for vinyl halide polymerization, the improvement comprising the steps of:

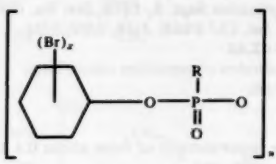
1. admixing a vinyl halide monomer composition with about 0.02 to about 0.3% water by weight based upon total monomer, and an organic or inorganic inert fine particle size material which is solid at least at reaction temperatures, is insoluble in said monomer, and consists essentially of particles having an average particle size in the range of about 0.001 to about 50 microns, the amount of water employed being about 27 to about 83 percent by weight of the inert fine particle size additive;
2. polymerization in a first stage using high speed agitation at a temperature of from about 30° to about 80° C. until about 3% to about 20% by weight of said monomer composition has been converted to polymer particles and
3. continuing said polymerization in a second stage during which the reaction mixture is subjected to low speed agitation until at least about 30% by weight of the reaction mixture has been converted to polymer comprising said inert fine particle size material.

4,028,330
FIRE RETARDANT POLYESTER FIBERS

Henry L. King, Cary, N.C., assignor to Monsanto Company, St. Louis, Mo.

Filed May 26, 1971, Ser. No. 147,167
Int. Cl.² C08K 5/53
U.S. Cl. 260—45.7 P 6 Claims

1. A synthetic fiber in which the fiber-forming substance is any long chain synthetic polymer comprised of at least 85% by weight of an ester of a dihydric alcohol and terephthalic acid containing not more than about 20%, based on the weight of the polymer, of a compound having the general formula:



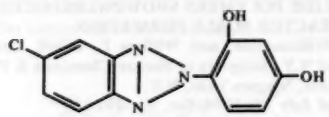
where R is a radical selected from the group consisting of alkyl, aromatic, and brominated aromatic; $x = 2$–4; and $n =$ 1–100.

4,028,331
ULTRA VIOLET ABSORBER

Seiji Hotta, Ibaraki; Koichi Koga, Oita; Tomoyuki Bando, Ibaraki, and Yutaka Kondo, Tokyo, all of Japan, assignors to Sumitomo Chemical Company, Limited and Kyodo Chemical Company, Ltd., both of, Japan

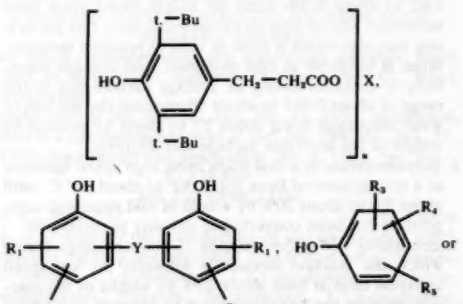
Filed Feb. 4, 1975, Ser. No. 547,091
Claims priority, application Japan, Feb. 8, 1974, 49-16435
Int. Cl.² C08K 5/13, 5/34, 5/46
U.S. Cl. 260—45.8 NT 9 Claims

1. A stabilized polyurethane resin composition comprising (1) a polyurethane resin and (2) a stabilizing amount of an ultraviolet absorber of the formula (A-1),



(A-1)

or a mixed ultraviolet stabilizer comprising the ultraviolet absorber (A-1) and an antioxidant which is selected from the group consisting of hindered phenols and hindered amines, said hindered phenol antioxidant being a compound of the formula,



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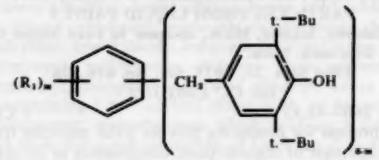
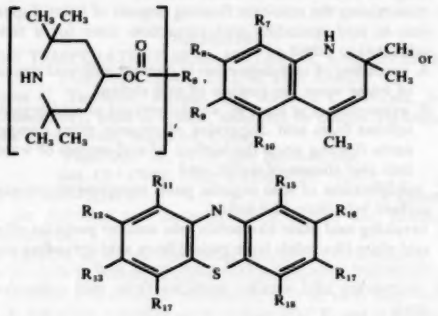


wherein X is a $C_1 - C_{18}$ alkyl, $C_1 - C_8$ alkylene, $-(CH_2)_4C$ or mono-, di- or tri-$C_1 - C_5$ alkyleneamine group, Y is a $C_1 - C_8$ alkylene, $C_4 - C_{18}$ alkylidene group or a sulfur atom, R_1 and R_2 are each a hydrogen atom or $C_1 - C_4$ alkyl group and R_1 and R_2 may be the same or different, R_3, R_4 and R_5 are each $C_1 - C_{18}$ alkyl group and R_3, R_4 and R_5 may be the same or different, n is an integer of 1 to 4 and m is an integer of 1 to 5 and said hindered amine antioxidant being a compound of the formula,



wherein R_6 is a $C_1 - C_{18}$ alkyl, aryl, aralkyl or $C_6 - C_{12}$ cycloalkyl group, R_7, R_8, R_9 and R_{10} are independently a hydrogen atom or a $C_1 - C_8$ alkyl or alkoxy group, R_{11}, R_{12} R_{13}, R_{14}, R_{15}, R_{16}, R_{17} and R_{18} are independently a hydrogen atom or a $C_1 - C_{18}$ alkyl group, and n′ is 1 and wherein the weight ratio of the ultraviolet absorber (A-1) to the antioxidant is 1:9 to 9:1.

4,028,332
STABILIZATION OF CROSS-LINKED POLYOLEFINS

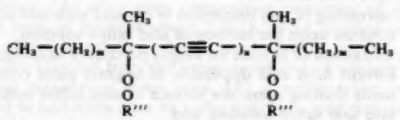
Donald G. Needham; Kenneth P. Taylor, and Claude V. Brown, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 14, 1975, Ser. No. 621,895
Int. Cl.² C08K 5/14, 5/36, 5/52
U.S. Cl. 260—45.8 R 9 Claims

1. A composition of matter comprising

I. a solid polymer selected from the group consisting of ethylene homopolmers and copolymers of ethylene and at least one acyclic mono-1-olefin having from 3 to 8 carbon atoms per molecule, and mixtures thereof, wherein said copolymers contain from 75 to 99 weight percent of said ethylene;

II. a crosslinking amount of an acetylenic diperoxy compound of the formula

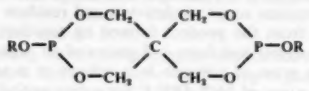


wherein n is an integer having a value of 1 or 2, m is an integer having a value of 0 or 1, and the sum of $n + m$ is 1 or 2, and

R''' is selected from the group consisting of tertiary alkyl having 4 to 8 carbon atoms, alkyl carbonate having 2 to 6 carbon atoms, haloalkyl carbonate having 2 to 6 carbon atoms, benzoate and lower alkyl-substituted benzoate; and

III. a stabilizing amount of a stabilizer system consisting essentially of

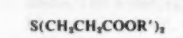
A. a dialkylpentaerythritol diphosphite having the formula



wherein R is an alkyl radical having from 12 to 20 carbon atoms, and

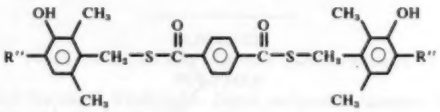
B. a sulfur-containing compound selected from the group consisting of

1. a diester of thiodipropionic acid having the formula



wherein R' is an alkyl radical having 4 to 22 carbon atoms; and

2. a bis(3-hydroxy-4-alkyl-2,6-dimethylbenzyl) dithiolterephthalate of the formula



wherein R'' is a branched chain alkyl group having from 4 to 12 carbon atoms, wherein the weight ratio of compound (A) to compound (B) is in the approximate range of 3:1 to 1:3.

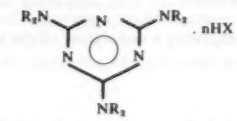
4,028,333

FLAME RETARDANT POLYMERIC COMPOSITIONS CONTAINING MELAMINE HYDROHALIDES

Michael W. Lindvay, Ann Arbor, Mich., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Dec. 18, 1975, Ser. No. 642,012
Int. Cl.² C08K *5/34*
U.S. Cl. 260—45.8 NT **11 Claims**

1. A flame retarded polyolefin polymer containing a flame retarding amount of a compound of the formula:



wherein each R is independently selected from a group consisting of hydrogen, alkyl, halogenated alkyl, phenyl, and halogenated phenyl groups, said alkyl groups containing from 1 to about 6 carbon atoms and said halogenated groups containing from 1 to about 5 halogen substituents per group, said halogen substituents selected from a group consisting of chlorine and bromine; wherein X is selected from a group consisting of chlorine and bromine; and wherein *n* is an integer from 1 to 3, and mixtures thereof.

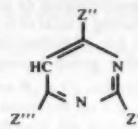
4,028,334

PIPERIDINE DERIVATIVES

Alexander Michael Chalmers, Cheadle; James Jack, Bramhall, and Barry Cook, Manchester, all of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 350,296, April 11, 1973, Pat. No. 3,925,376. This application Sept. 26, 1975, Ser. No. 617,220
Int. Cl.² C07D *239/00;* **C08K** *5/34*
U.S. Cl. 260—45.8 N **19 Claims**

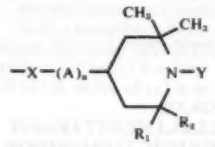
1. A compound of the formula



I

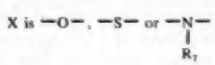
and salts thereof, wherein

Z' is a group having the formula:

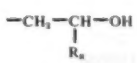


II

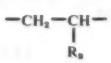
wherein R_1 and R_2 are the same or different and each is a straight or branched alkyl having from 1 to 12 carbon atoms or R_1 and R_2 form, together with the ring carbon atom to which they are bound, a cycloalkyl having from 5 to 12 carbon atoms;



R_7 is hydrogen, a straight- or branched alkyl having from 1 to 20 carbon atoms or an aralkyl having from 7 to 12 carbon atoms; Y is oxygen, hydrogen, a straight- or branched alkyl having from 1 to 20 carbon atoms, an alkenyl or alkynyl having from 3 to 12 carbon atoms, an aralkyl group having from 7 to 12 carbon atoms or the group



wherein R_8 is hydrogen, or a methyl or phenyl; n is zero or 1; and A is $-CH_2-$, or the group



wherein R_9 is a hydrogen or an alkyl having from 1 to 20 carbon atoms; Z'' and Z''' are the same or different and each is a piperidine group of formula II as hereinbefore defined, a halogen atom, a substituted amino group having the formula:

III

wherein R_3 and R_4 are the same or different and each is hydrogen, a straight or branched alkyl having from 1 to 20 carbon atoms, a cycloalkyl having from 5 to 12 carbon atoms, an aryl

which is unsubstituted or substituted with one or more alkyl groups and having a total of from 6 to 18 carbon atoms or an aralkyl having from 7 to 12 carbon atoms, or R_3 and R_4, together with the nitrogen atom to which they are bound, form a heterocyclic group having 5 to 7 ring atoms; or Z'' and Z''' are a hydroxy or an ether group having the formula:

$$-OR_5 \qquad \text{IV}$$

wherein R_5 is hydrogen, a straight or branched chain alkyl having from 1 to 20 carbon atoms, a cycloalkyl having from 5 to 12 carbon atoms, an aryl which is unsubstituted or substituted by one or more alkyl groups and having a total of 6 to 18 carbon atoms, or an aralkyl having from 7 to 12 carbon atoms; or Z'' and Z''' are a thiol or thio ether group having the formula:

$$-SR_6 \qquad \text{V}$$

wherein R_6 is hydrogen, a straight or branched alkyl having from 1 to 20 carbon atoms or a cycloalkyl having from 5 to 12 carbon atoms.

4,028,335

THERMALLY STABLE FLAME-RETARDANT THERMOPLASTIC MOLDING COMPOSITION

Daniel Wayne Fox, Pittsfield, Mass., assignor to General Electric Company, Pittsfield, Mass.

Continuation-in-part of Ser. No. 527,167, Nov. 25, 1974, abandoned. This application Aug. 23, 1976, Ser. No. 716,882

Int. Cl.² C08K *5/59*

U.S. Cl. 260—45.75 B **4 Claims**

1. A thermally stable flame-retardant thermoplastic molding composition comprising in admixture, a styrenic polymer, from 1.0 to about 20 weight percent of a polyhalodiphenyl carbonate containing 6–10 halogen atoms and from 0.5 to about 10.0 weight percent of antimony trioxide; said weight percent being based on the weight of styrenic polymer; said halogen atoms being selected from the group consisting of bromine or chlorine or mixtures thereof.

4,028,336

PLASTIC COMPOSITIONS

Arnold L. Anderson, Alma, Mich., assignor to Velsicol Chemical Corporation, Chicago, Ill.

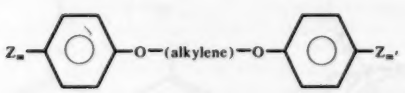
Filed Feb. 8, 1973, Ser. No. 330,790

The portion of the term of this patent subsequent to Apr. 5, 1994, has been disclaimed.

Int. Cl.² C08L *75/04*

U.S. Cl. 260—45.75 R **15 Claims**

1. A plastic composition comprising a polyurethane and a flame retardant, said flame retardant consisting of a compound having the formula



wherein (a) Z is bromine; (b) *m* and *m'* are independent and are integers having a value of from 1 to 5; and (c) alkylene is a straight or branched chain alkylene group having from one to six carbon atoms.

4,028,337

TECHNIQUE FOR STABILIZATION OF VINYL CHLORIDE POLYMERS

William Herbert Starnes, Jr., Roselle Park, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

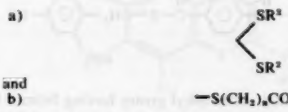
Continuation-in-part of Ser. No. 534,766, Dec. 20, 1974, abandoned. This application Mar. 24, 1976, Ser. No. 669,858

Int. Cl.² C08K *5/58*

U.S. Cl. 260—45.75 S **9 Claims**

1. Technique for preparing a stable vinyl chloride polymer which comprises removing heavy metal residues by solvent extraction from the product formed by reaction of a vinyl chloride polymer and from 1–8 grams of an organotin compound per gram of polymer in a solvent at a temperature within the range of 160°–185° C for a time period within the range of 76–18 hours, the shorter time periods corresponding with the higher temperatures and the converse, the organotin compound being of the formula

wherein R^1 is a straight chain hydrocarbon radical having from 1–8 carbon atoms and —X is a radical selected from the group consisting of



wherein R^2 is selected from the group consisting of straight chain hydrocarbon radicals having from 1–8 carbon atoms and $-CH_2COOR^3$ wherein R^3 is a hydrocarbon radical having from 1–8 carbon atoms, *n* being an integer from 1–8, the solvent being capable of dissolving vinyl chloride polymers and evidencing a boiling point in excess of 160° C.

4,028,338

FLUOROSILOXYDIPHENYLSILOXY BLOCK COPOLYMERS

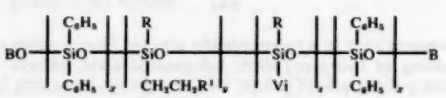
John S. Razzano, Watervliet, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Oct. 9, 1975, Ser. No. 621,032

Int. Cl.² C08G *77/04*

U.S. Cl. 260—46.5 R **3 Claims**

1. A solvent resistant block copolymer having desirable processability comprising a copolymer of the formula,



where R is an alkyl radical of 1 to 3 carbon atoms, R^1 is a perfluoroalkyl radical of 1 to 8 carbon atoms, Vi is vinyl, B is selected from the class consisting of lithium and hydrogen, *z* varies from 0 to 100, *x* varies from 20 to 400 and *y* varies from 700 to 6000.

4,028,339

ORGANOPOLYSILOXANE RELEASE RESINS USEFUL IN COOKING AND BAKING PROCESSES

Duane F. Merrill, Ballston Spa, N.Y., assignor to General Electric Company, Waterford, N.Y.

Division of Ser. No. 505,988, Sept. 16, 1974, Pat. No. 3,925,276, which is a continuation-in-part of Ser. No. 115,715, Feb. 16, 1971, abandoned, which is a continuation-in-part of Ser. No. 798,187, Feb. 10, 1969, abandoned, which is a continuation-in-part of Ser. No. 671,574, Sept. 29, 1967, abandoned. This application Nov. 22, 1974, Ser. No. 526,397

Int. Cl.² C08G *77/04*

U.S. Cl. 260—46.5 R **32 Claims**

1. A cooking utensil comprising an interior cooking surface having coated thereon a silanol-containing organopolysiloxane resin said resin prepared by the process comprising the steps of

i. agitating a mixture comprising (A) an organohalosilane blend consisting essentially of about 60 mole percent methyltrichlorosilane, about 35 mole percent phenyltrichlorosilane, and about 5 mole percent dimethyldichlorosilane, (B) water, (C) acetone, and (D) a water-immiscible organic solvent, wherein there is present by weight in said mixture per part by weight of (A), about 1.7 to about 10 parts of (B), about 0.2 to about 5 parts of (C), and about 0.3 to about 5 parts of (D); and

ii. separating the organic solvent solution of (F) from the resulting hydrolysis mixture of step (i), wherein (F) is a silanol-containing organopolysiloxane resin having an average ratio of about 1.05 organic radicals per silicon atom.

4,028,340

PROCESS FOR PREPARING P-VINYLPHENOL POLYMER

Kenji Kanezaki, Kitakyushu, Japan, assignor to Maruzen Oil Co. Ltd., Osaka, Japan

Filed Feb. 27, 1976, Ser. No. 661,874

Claims priority, application Japan, Mar. 1, 1975, 50-25207

Int. Cl.² C08F *132/00, 112/00, 12/04*

U.S. Cl. 260—47 UA **18 Claims**

1. A process for preparing a p-vinylphenol polymer which comprises dehydrogenating crude p-ethylphenol containing at least one of m-ethylphenol and o-ethylphenol to convert the ethylphenol(s) to vinylphenol(s), polymerizing the resulting crude product by heat or cationic polymerization without purification, and then purifying the resulting polymerization product by precipitating the p-vinylphenol with a non-solvent therefor or by the film evaporation method.

4,028,341

PROCESS FOR THE PREPARATION OF POLYPHENYLENE OXIDES WITH HYDROLYTICALLY STABLE COPPER CATALYSTS

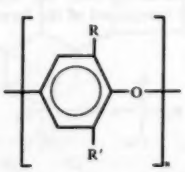
Allan S. Hay, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 441,295, Feb. 11, 1974, abandoned. This application Jan. 13, 1975, Ser. No. 540,473

Int. Cl.² C08G *65/44*

U.S. Cl. 260—47 ET **23 Claims**

1. A process for formation of a polyphenylene oxide having the formula



where R and R′ are lower primary alkyl and *n* is a number representing the average degree of polymerization and is at least 100 which comprises:

oxidatively coupling the corresponding monohydric phenol with an oxygen-containing gas under polymer-forming reaction conditions in a liquid reaction mixture which is essentially free of ammonium ion and in which the phenol is soluble

in the presence of a copper-amine complex soluble in the reaction mixture comprising

a. copper ion

b. bromide ion

c. a diamine having the formula

$$R_bHN—R_a—NHR_c$$

where R_a is C_{2-4}-alkylene or C_{3-7}-cycloalkylene and R_b and R_c are isopropyl or C_{4-8}-tertiary alkyl, including cycloalkyl, in which only the α-carbon atom has no hydrogens, there being at least two and no more than three carbon atoms separating the two nitrogen atoms

d. a tertiary amine which is N-methylpyrrolidine, triethylenediamine or a trialkylamine wherein at least two of the alkyl groups are methyl and the third is C_{1-6} primary or C_{3-6} secondary alkyl,

wherein, the molar ratio of (b) to (a) is at least 2, the molar ratio of (c) to (a) is at least 1 and the ratio of equivalents of (d) to moles of (a) is at least 6.

4,028,342

POLYMERIC PHENOLIC ANTIOXIDANTS

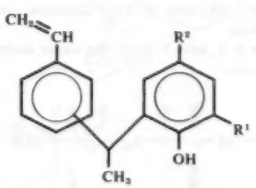
James A. Dale, Menlo Park, and William J. Leonard, San Francisco, both of Calif., assignors to Dynapol Corporation, Palo Alto, Calif.

Division of Ser. No. 449,929, March 11, 1974, Pat. No. 3,930,047. This application May 29, 1975, Ser. No. 581,611

Int. Cl.² A23D *5/04*; C08F *19/10*

U.S. Cl. 260—47 UA **14 Claims**

1. A material consisting essentially of a compound having the structural formula



wherein R_1 is a lower alkyl of from 1 to 5 carbons inclusive, and R_2 is hydrogen.

4,028,343

ORGANOFUNCTIONAL SILICON COMPOUNDS AS ADHESIVIZERS FOR ORGANIC BINDING AGENTS

Jurgen Amort, Troisdorf, Sieglar, and Heinz Nestler, Troisdorf, Eschmar, Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

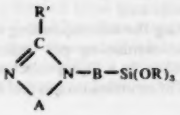
Filed Apr. 28, 1975, Ser. No. 572,585

Claims priority, application Germany, Apr. 30, 1974, 2420851

Int. Cl.² C07D *233/04*; C08G *2/28, 18/00, 59/00*

U.S. Cl. 260—59 R **14 Claims**

1. In an adhesive composition comprising an organic polyaddition or polycondensation polymer and an adhesivizing silane, the improvement where said silane has the general formula:



wherein R is a C_1–C_4 alkyl radical which can contain oxygen or sulfur atom in the chain, R′ is a C_{1-4} alkyl radical or hydrogen, A is a bivalent, saturated, branched or unbranched hydrocarbon radical having 2 to 4 carbon atoms in the chain and B is a bivalent, saturated, branched or unbranched hydrocarbon radical having 1 to 10 carbon atoms in the chain, said silane being present in said compositiom in an amount of 0.5 to 5 weight percent.

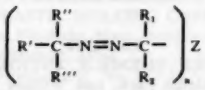
4,028,344

α-ISOCYANATO AND α-ISOTHIOCYANATO AZOS AND THEIR DERIVATIVES

Harold Carl Lange, Grand Island, and Ronald Edward MacLeay, Williamsville, both of N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.

Filed Mar. 21, 1974, Ser. No. 453,452
Int. Cl.² C07C *107/02;* **C08J** *9/00*
U.S. Cl. 260—174 **10 Claims**

1. A compound of the formula



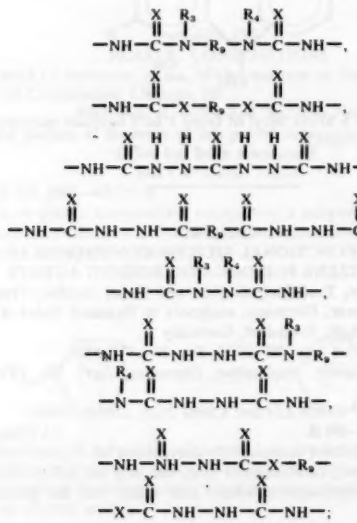
where:

a. *n* is 1 or 2;

b. R′, R″ and R‴ are selected from alkyl of 1–8 carbons and and aralkyl of 7–12 carbons, or 2 or more of R′, R″ and R‴ joined with the tertiary carbon atom to which they are attached form cycloalkyl of 3–12 carbons: or R″ is aryl of 6–14 carbons; or R‴ is cyano or Y;

c. R_1 and R_2 are selected from alkyl of 1–8 carbons, cycloalkyl of 3–12 carbons, aralkyl of 7–12 carbons, or taken together are alkylene of 3–11 carbons; or R_2 is aryl of 6–14 carbons;

d. Z, when *n* is 1, and Y have the same definition and are selected from:



e. X is oxygen or sulfur;

f. R_3 and R_4 are selected from hydrogen, alkyl of 1–12 carbons, cycloalkyl or 3–12 carbons, aralkyl of 7–12 carbons, aryl of 6–14 carbons and, taken together, alkylene of 3–11 carbons;

g. R_5 is selected from alkyl of 1–12 carbons, cycloalkyl of 3–12 carbons, aralkyl of 7–12 carbons and aryl of 6–14 carbons;

h. R_6 is selected from hydrogen, alkyl of 1–8 carbons, cycloalkyl of 3–8 carbons, aralkyl of 7–12 carbons and aryl of 6–14 carbons;

i. R_7 is selected from primary or secondary alkyl of 1–12 carbons and cycloalkyl of 3–12 carbons;

j. R_8 is selected from tertiary alkyl of 4–8 carbons and aryl of 6–14 carbons; and

k. R_9 is a hydrocarbyl diradical selected from aliphatic hydrocarbyl of 2–20 carbons, cycloaliphatic hydrocarbyl of 3–20 carbons, aliphatic-cycloaliphatic hydrocarbyl of 4–20 carbons and aromaticaliphatic hydrocarbyl of 7–20 carbons optionally containing one or more nonadjacent and nonterminal oxygen, sulfur or nitrogen atoms in the backbone structure, and from aromatic of 6–12 carbons.

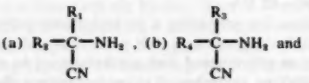
4,028,345

PROCESS FOR THE PREPARATION OF AZODINITRILES FROM AMINONITRILES IN THE PRESENCE OF A SURFACTANT

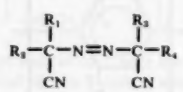
Earl Phillip Moore, Jr., Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 540,084, Jan. 10, 1975, abandoned. This application Oct. 3, 1975, Ser. No. 618,761
Int. Cl.² C07C *107/02*
U.S. Cl. 260—192 **20 Claims**

1. The process for the preparation of azodinitriles comprising reacting an alpha-aminonitrile selected from the group consisting of



mixtures of (a) and (b) wherein R_1, R_2, R_3 and R_4 are selected from the group consisting of (1) acylic aliphatic hydrocarbon radicals of 1 to 9 carbon atoms, (2) carbon acylic aliphatic radicals of 1 to 8 carbon atoms substituted with carboxyl, hydroxyl or —OR wherein R is selected from an acyclic aliphatic hydrocarbon radical of 1 to 4 carbon atoms, (3) cyclic aliphatic hydrocarbon radicals of 3 to 6 carbon atoms and (4) cyclic aliphatic hydrocarbon radicals of 3 to 11 carbon atoms formed by combining R_1 and R_2 or R_3 and R_4, with 5 to 15% by weight based on the reaction mixture of a metal hypochlorite, $M(OCl)_x$ where M is selected from sodium, potassium or calcium and *x* is the valence of M, in an aqueous medium in the presence of 0.25 to 10% by weight based on the weight of aminonitrile of a surface active compound or mixtures thereof having an HLB of 8 to 35 at a temperature of −10° C to 30° C said metal hypochlorite and alpha-aminonitrile being present in an equivalent ratio of from 1:1 to 2:1 of hypochlorite to aminonitrile and recovering from the reaction mixture an aliphatic azodinitrile compound of the formula



wherein R_1, R_2, R_3 and R_4 are as defined and R_1 and R_2 may be the same as R_3 and R_4.

4,028,346
TETRASELENOFULVALENE, DITHIODISELENOFULVALENE AND THE TCNQ SALTS THEREOF

Edward M. Engler, Wappingers Falls, and Vishnubhai V. Patel, Ossining, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 10, 1974, Ser. No. 477,553
Int. Cl.² C07D *421/04*
U.S. Cl. 260—239 R **4 Claims**

1. A composition of matter tetraselenofulvalene.

4. A composition of matter dithiodiselenafulvalene tetracyano-p-quinodimethanide.

4,028,347
METHOD FOR PROCESSING LACTAM RESIDUES WHICH CONTAIN BORIC ACID

Hans-Helmut Schwarz, Krefeld-Traar, and Otto Immel, Krefeld, both of Germany, assignors to Bayer Aktiengesellschaft, Germany

Continuation of Ser. No. 395,714, Sept. 10, 1973, abandoned. This application June 5, 1975, Ser. No. 584,219
Claims priority, application Germany, Sept. 15, 1972, 2245300
Int. Cl.² C07D *201/16*
U.S. Cl. 260—239.3 A **6 Claims**

1. In the method of recovering a lactam from a mixture comprising lactam and boric acid produced by rearrangement of an oxime to a lactam in the gaseous phase in the presence of a catalyst containing boric acid, said method comprising distilling said mixture to obtain lactam and a distillation residue of boric acid and lactam and then recovering lactam from said distillation residue by further distillation, the method of improving the yield of lactam recovered from said distillation residue which comprises introducing 0.5 to 2 mol, per mol of boric acid, of a polyhydric alcohol having 3 to 10 carbon atoms into said distillation residue and heating the resulting mixture to 80° to 170° C. In order to remove water produced by distilling and subsequently removing the lactam from the mixture by distillation to thereby obtain lactam substantially free of boric acid as distillate, said lactam being selected from the group consisting of caprolactam and the lactams of ω-aminovaleric acid, ω-aminocaprylic acid, ω-aminoundecanoic acid and ω-aminolauric acid.

5. The method of claim 1 wherein said lactam is caprolactam.

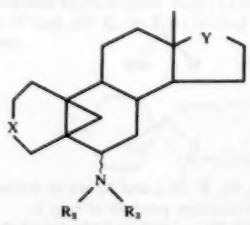
4,028,348
6-AMINO-5β,19-CYCLOANDROSTANE DERIVATIVES

Pal Bíte; Imre Moravcsik; Inge Schäfer; Gyula Horváth; Zsuzsanna Méhesfalvi née Vajna; János Borvendég, and Ilona Hermann née Szente, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar RT, Budapest, Hungary

Filed Feb. 17, 1976, Ser. No. 658,863
Int. Cl.² C07J *41/00*, *43/00*
U.S. Cl. 260—239.5 **1 Claim**

1. A 6-amino-5β,19-cycloandrostane derivative of formula I and its pharmaceutically acceptable acid addition salts

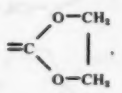
(I)



wherein

X denotes any of the groups of the formula =CH(OR), =CO or =C=N-OR_1,

Y denotes any of the groups of the formula =CO, =CH(OR_1), =C=N-OR_1, =C(OR_1)-C ≡ CH or



wherein

R denotes a hydrogen atom, a C_{1-4} alkyl group or a C_{2-5} acyl group, and

R_1 denotes a hydrogen atom a straight-chained or branched C_{1-5} alkyl group, a straight-chained or branched C_{1-5} hydroxyalkyl group, a C_{5-8} cycloalkyl group, an allyl group, or a benzyl group, and

R_3 has the same meaning as R_2 but if R_2 is a sec. or tert. alkyl group or an alicyclic group, then R_3 can only be a hydrogen atom; and if R_2 is a benzyl group then R_3 can only be a hydrogen atom or a primary alkyl group, further

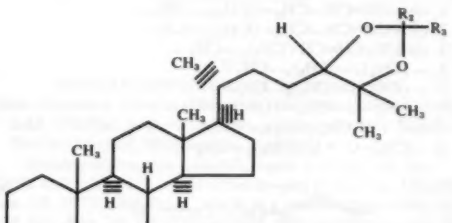
R_2 and R_3 may denote together with the adjacent nitrogen atom a piperidine, a morpholine, or an N-methylpiperazine group.

4,028,349
SYNTHESES OF 24R,25- AND 24S,25-DIHYDROXYCHOLESTEROL 24,25-KETALS AND ALKANOYL DERIVATIVES THEREOF

John Joseph Partridge, Jr., and Milan Radoje Uskokovic, both of Upper Montclair, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Mar. 8, 1976, Ser. No. 664,833
Int. Cl.² C07J *71/00*
U.S. Cl. 260—239.55 D **33 Claims**

1. A compound of the formula



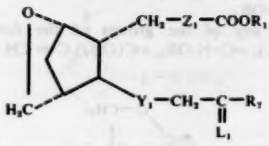
wherein R_1 is hydroxy, lower alkoxy, phenyl lower alkoxy, lower alkanoyloxy or benzoyloxy, R_2 and R_3 each taken independently are lower alkyl, R_2 and R_3 taken together are lower alkylene and the absolute configuration at C-24 is R or S.

4,028,350
9α,11αOR 11α,9αEPOXYMETHANO-PROSTAGLANDANS AND PROCESS FOR THEIR PREPARATION

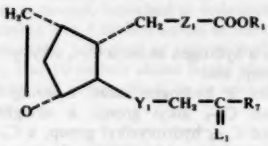
Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed June 25, 1976, Ser. No. 699,672
Int. Cl.² C07D *307/06*, *307/28*
U.S. Cl. 260—240 R **58 Claims**

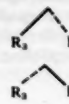
1. A process for preparing a prostaglandin analog of the formula:



or



wherein Y_1 is trans—CH=CH—,—C C—, or $—CH_2CH_2—$; wherein L_1 is

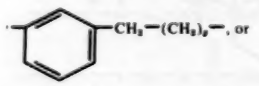


or a mixture of

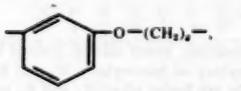
and

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro; wherein Z_1 is

1. cis—CH=CH—CH_2—$(CH_2)_g$—CH_2—,
2. cis—CH=CH—CH_2—$(CH_2)_g$—CF_2—,
3. cis-CH_2-CH=CH-$(CH_2)_g$—CH_2—,
4. —$(CH_2)_3$—$(CH_2)_g$—CH_2—,
5. —$(CH_2)_3$—$(CH_2)_g$—CF_2—,
6. —CH_2—O—CH_2—$(CH_2)_g$—CH_2—,
7. —C C-CH_2-$(CH_2)_g$—CH_2—,
8. —CH_2—O ≡ C-$(CH_2)_g$—CH_2—,



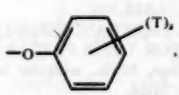
(9)



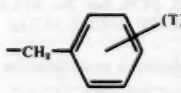
(10)

wherein g is one, 2, or 3;
wherein R_7 is

1. —$(CH_2)_m$—CH_3,

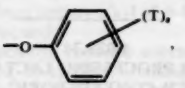


(2)



(3)

wherein 1 is zero to three, inclusive, wherein m is one to 5, inclusive, T is chloro, fluoro, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, and s is zero, one, 2, or 3, the various T's being the same or different, with the proviso that not more than two T's are other than alkyl, with the further proviso that R_7 is

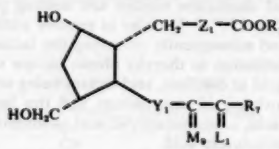


wherein T and s are as defeind above, only when R_3 and R_4 are hydrogen or methyl, being the same or different; and

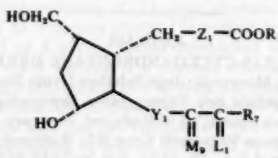
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation,

with the proviso that Z_1 is $—(CH_2)_3—(CH_2)_g—CH_2—$, Y_1 is $—CH_2CH_2—$, and R_3 and R_4 are both hydrogen, only when R_7 is not $—(CH_2)_m—CH_3$; which comprises:

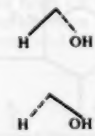
1. sulfonating the ring hydroxyl of prostaglandin-type compound of the formula



or



respectively, wherein M_9 is



or

and wherein L_1, R_1, R_7, R_8, Y_1, and Z_1 are as defined above;

2. cyclizing the reaction product of step 1;
3. deoxygenating the secondary hydroxyl of the reaction product of step 2.

4,028,351

METHOD FOR THE PREPARATION OF DERIVATIVES OF SPIRO (4,5)-DECANE AND DERIVATIVES THUS OBTAINED

Ida Taccone, Voghera (Pavia), Italy, assignor to Buskine S.A., Fribourg, Switzerland

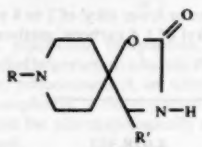
Continuation-in-part of Ser. No. 445,634, Feb. 25, 1974, abandoned, which is a continuation of Ser. No. 286,752, Sept. 6, 1972, abandoned. This application Feb. 11, 1975, Ser. No. 549,061

Claims priority, application Switzerland, Sept. 7, 1971, 13141/71; Feb. 12, 1974, 2053/74

Int. Cl.² C07D *498/10*

U.S. Cl. 260—240 K **10 Claims**

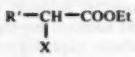
1. A method for the preparation of a spiro-[4,5]- decane derivative having the formula:



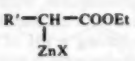
(I)

in which R is selected from the group consisting of beta-phenylethyl, 3′,4′-methylenedioxy (beta-phenyl-ethyl)-, beta-(p-fluoro)-phenyl-ethyl; beta-phenoxy-ethyl, cinnamyl, diphenyl-methyl, and beta-(3′-trifluoromethyl)-phenyl- ethyl, and R′ is hydrogen or phenyl, which comprises the steps of:

1. reacting, at a temperature of between 50° and 60° C, an alpha-halogen alkyl acetate, having the formula

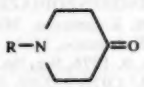


wherein R′ is as defined above and X is Cl, Br or I, in the presence of activated elemental zinc to form a primary adduct having the formula

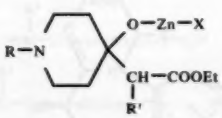


wherein R′ and X have the above defined meanings, in an anhydrous solvent mixture of benzene and ethyl ether, until the alpha-halogen alkyl ester is wholly absent from the reaction mixture;

2. adding at least one mole of an N-substituted-4-piperidone of the formula

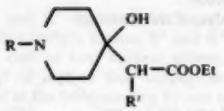


where R is as defined above per mole of primary adduct in the reaction mixture from step (1) at a temperature between 0° and 20° C. to form a final adduct, having the formula



3. completely precipitating the final adduct at a temperature of 0° C by stepwise addition of anhydrous ethyl ether, and separating the final organo-metallic adduct by filtering and drying;

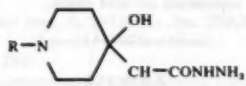
4. decomposing the solid final adduct with water to form an oily beta-hydroxy ester product of the formula



wherein R and R′ are as defined above;

5. neutralizing the reaction mixture from step (4) to pH 7; extracting the beta-hydroxy ester product with an organic solvent and isolating the beta-hydroxy ester;

6. reacting said beta-hydroxy ester product with excess hydrazine for 8 to 30 hours at a temperature of 40°–60° C, in the molar ratio of ester to hydrazine of 1:1.5 to 1:100, to form the corresponding beta-hydroxy-hydrazide, having the formula



and (7) rearranging said beta-hydroxy hydrazide, according to the Curtius transportion reaction, by reacting it with excess nitrous acid, in the presence of a diluted mineral acid at a temperature from room temperature to 60° C, to form the spiro [4,5]-decane derivative of formula (I).

4,028,352

BENZAMIDOPIPERIDINE DERIVATIVES

John Frederick Cavalla, Isleworth, and John Leheup Archibald, Windsor, both of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

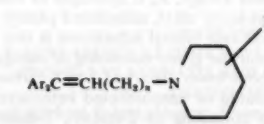
Division of Ser. No. 564,509, April 2, 1975, Pat. No. 3,992,389, which is a continuation-in-part of Ser. No. 323,684, Jan. 15, 1973, abandoned, which is a continuation of Ser. No. 175,345, Aug. 26, 1971, abandoned. This application Apr. 20, 1976, Ser. No. 678,773

Claims priority, application United Kingdom, Sept. 30, 1970, 42090/70; July 22, 1971, 34376/71; Dec. 21, 1972, 59144/72

Int. Cl.² C07D *211/06*

U.S. Cl. 260—240 R **3 Claims**

1. A compound selected from the group consisting of (A) heterocyclic compounds of formula I*a*



Ia

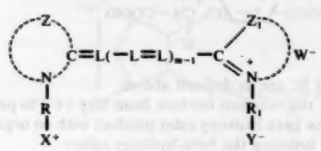
where *n* denotes an integer from 1 to 4, Ar represents phenyl or monohalophenyl and R represents phenyl and (B) the pharmaceutically acceptable acid addition and quaternary ammonium salts thereof.

4,028,353
NOVEL CHEMICAL COMPOUNDS

Alan L. Borror, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 167,500, July 29, 1971, Pat. No. 3,734,739. This application Nov. 30, 1972, Ser. No. 310,942
Int. Cl.² C07D *403/06*
U.S. Cl. 260—240.6 **8 Claims**

1. A cyanine dye of the formula:



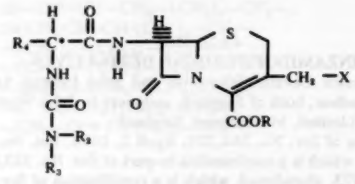
wherein L represents a methine group; *m* represents a positive integer of from 1 to 3, inclusive; Z and Z_1 each represents the nonmetallic atoms necessary to complete a heterocyclic ring system of the azole or azine series; R and R_1 each represents a divalent aliphatic group, cycloalkylene group or arylene group; X^+ represents a quaternary ammonium, sulfonium or phosphonium group; Y^- represents a $-SO_3^-$ or a $-COO^-$ group; and W^- represents an acid anion.

4,028,354
ALKENYL AND ALKINYLUREIDO CEPHALOSPORINS

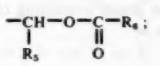
Hermann Breuer, and Uwe D. Treuner, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Mar. 8, 1976, Ser. No. 664,467
Int. Cl.² C07D *501/36*
U.S. Cl. 260—243 C **35 Claims**

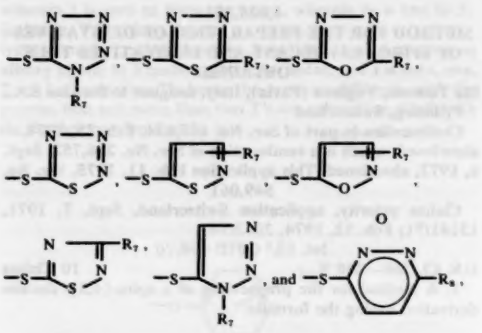
1. A compound of the formula:



wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, diphenyl-lower alkyl, tri(lower alkyl) silyl, trihaloethyl, an alkali metal ion, and alkaline earth metal ion, an alkaline earth metal ion, dibenzylaminē, N,N-dibenzylethylenediamine, methylamine, triethylamino, N-ethylpiperidine or



R_2 is lower alkenyl or lower alkinyl; R_3 is hydrogen or lower alkyl; R_4 is phenyl, phenyl-lower alkyl, substituted phenyl or phenyl-lower alkyl wherein said phenyl substituent is one or two members selected from the group consisting of halogen, lower alky of 1 to 4 carbons lower alkoxy of 1 to 4 carbons, and hydroxy, or a substituted or unsubstituted heterocyclic selected from the group consisting of 2-thienyl, 3-thienyl, 2-furyl, and 3-furyl wherein said heterocyclic substituent is attached at an available carbon atom and is halogen or lower alkyl of 1 to 4 carbons; R_5 is hydrogen or lower alkyl; R_6 is lower alkyl; and X is a heterothio group selected from the group consisting of



wherein R_7 is hydrogen or lower alkyl of 1 to 4 carbons and R_8 is hydrogen, lower alkyl of 1 4 carbons, methoxy, hydroxy,or halogen.

4,028,355
CEPHALOSPORIN PURIFICATION PROCESS

Dale W. Blackburn, Moorestown, N.J., assignor to SmithKline Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 435,911, Jan. 23, 1974, abandoned. This application July 18, 1975, Ser. No. 597,256
Int. Cl.² C07D *501/12*
U.S. Cl. 260—243 C **20 Claims**

1. A process for the purification of a semisynthetic cephalosporin which contains a free carboxylic acid comprising
   a. contacting an aqueous solution of said semisynthetic cephalosporin, said solution having a pH of 3 to 6.5 so that said semisynthetic cephalosporin is about 99% ionized, with an adsorbent, said adsorbent being a nonionic macroreticular polymeric resin, said resin being a cross-linked styrene-divinylbenzene copolymer with an average pore size of 90 A or a cross-linked acrylic ester polymer with an average pore size of 80 to 250 A and eluting said semisynthetic cephalosporin from said adsorbent and adsorbed impurities with an eluant, said eluant being an aqueous solution having a pH of 3 to 8.5 so that said semisynthetic cephalosporin is maintained in the ionized form;
   b. acidifying the eluates which contain the semisynthetic cephalosporin to a pH below its pKa; and
   c. collecting the resulting precipitated semisynthetic cephalosporin.

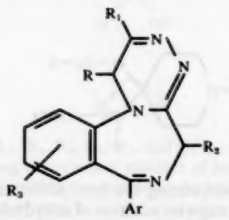
4,028,356
TRIAZINOBENZODIAZEPINES

Robert Bruce Moffett, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Feb. 9, 1976, Ser. No. 656,372
Int. Cl.² C07D *253/08, 487/04*
U.S. Cl. 260—248 AS **21 Claims**

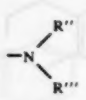
1. A compound of formula IV:

IV



wherein R and R_2 are hydrogen or methyl; wherein R_1 is —COOH, —COOR′ in which R′ is alkyl or 1 to 3 carbon atoms (inclusive), $-(CH_2)_nA$ in which *n* is an integer of 1 to 3 and A is fluoro, chloro, bromo, trifluoromethyl, hydroxy, alkoxy in which the alkyl group is defined as above, or

in which R″ and R‴ are hydrogen or alkyl as defined above or together



is pyrrolidino, piperidino, morpholino, 4-methylpiperazino, 4-(2-hydroxyethyl)piperazino; wherein R_3 is hydrogen, fluoro, chloro, bromo, trifluoromethyl, or nitro, and wherein Ar is phenyl, o-chlorophenyl, o-fluorophenyl, 2,6-difluorophenyl, or 2-pyridyl, and the pharmacologically acceptable acid addition salts thereof.

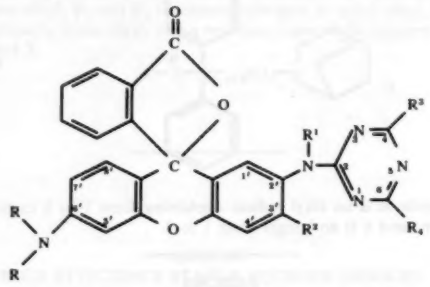
4,028,357

2′-(4,6-DISUBSTITUTED)-s-TRIAZIN-2-YL)AMINO-6′-DIALKYLAMINO FLURANS

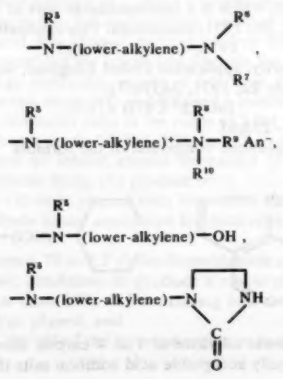
Nathan Norman Crounse, Cincinnati, Ohio, assignor to Sterling Drug Inc., New York, N.Y.

Filed July 31, 1975, Ser. No. 600,773
Int. Cl.² C07D *251/44, 251/50, 251/70*
U.S. Cl. 260—249.5 **22 Claims**

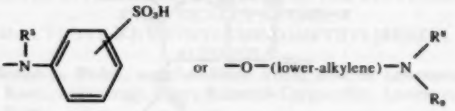
1. A compound having the formula



where R represents non-tertiary alkyl of one to four carbon atoms; R^1 and R^2 represent hydrogen or non-tertiary alkyl of one to four carbon atoms; R^3 and R^4 represent chlorine, NH_2 or one of the groups



-continued



in which R^5, R^6 and R^7 represent hydrogen or non-tertiary alkyl of one to four carbon atoms; R^8 and R^9 represent non-tertiary alkyl of one to four carbon atoms; R^{10} represents non-tertiary alkyl of one to four carbon atoms, benzyl or benzyl substituted in the benzene ring by one or two of halo or alkyl of one to three carbon atoms; and An represents an anion selected from the group consisting of halides, hydroxy, alkanoates, nitrate, phosphate, alkylsulfates and arylsulfates.

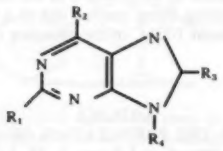
4,028,358

6-FLUORO-9-PERFLUOROBUTYL PURINE

Charles L. Liotta, 3691 Stanford Circle, Decatur, Ga. 30034, and John D. Muzzy, 631 Norfleet Road NW., Atlanta, Ga. 30305

Filed Sept. 4, 1973, Ser. No. 393,718
Int. Cl.² C07D *473/40*
U.S. Cl. 260—254 **1 Claim**

1. A purine compound of the following formula:



wherein R_1 and R_3 are hydrogen, R_2 is fluorine, and R_4 is perfluorbutyl.

4,028,359

2-DIETHOXYETHYL(DIMETHYL)(2-(2,4-DIPHENYL-5-PYRIMIDYL)-2-OXOETHYL)AMMONIUM BROMIDE

Thomas J. Schwan, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed May 3, 1976, Ser. No. 682,397
Int. Cl.² C07D *239/24*
U.S. Cl. 260—256.4 R **1 Claim**

1. 2-Diethoxyethyl(dimethyl)[2-(2,4-diphenyl-5-pyrimidyl)-2-oxoethyl]ammonium bromide.

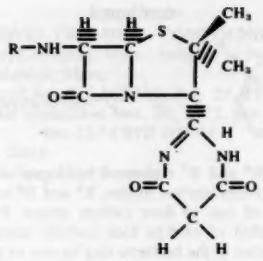
4,028,360

6-ACYLAMIDO-2,2-DIMETHYL-3-(PYRIMIDIN-4,6-DIONE-2-YL)-PENAMS AND INTERMEDIATES THEREFOR

Gene Michael Bright, Groton, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Mar. 23, 1976, Ser. No. 669,508
Int. Cl.² C07D *499/42, 499/44, 499/32*
U.S. Cl. 260—256.5 R **1 Claim**

1. A compound having the formula



wherein R is selected from the group consisting of hydrogen and the pharmaceutically-acceptable acid addition salts thereof.

4,028,361

PROCESS FOR THE PURIFICATION OF MDA

Adnan A. R. Sayigh, North Haven; Kwok K. Sun, Hamden, and Henri Ulrich, Northford, all of Conn., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Aug. 18, 1975, Ser. No. 605,751

Int. Cl.² C07C *85/16*

U.S. Cl. 260—570 D **12 Claims**

1. A process for selectively removing 2,2′- and 2,4′-diaminodiphenylmethanes from admixtures thereof with 4,4′-diaminodiphenylmethane which comprises heating said mixtures of isomeric diamines with a member selected from the class consisting of 1,3,5-triarylhexahydro-1,3,5-triazines and polyaminals obtained as by-products in the formation of said triazines, said heating being carried out at a temperature of about 30° C to about 100° C in the presence of aqueous mineral acid.

4,028,362

PROCESS FOR THE PREPARATION OF QUINOLINES

Jozef A. Thoma, Sittard, and Petrus A. M. J. Stijfs, Munstergeleen, both of Netherlands, assignors to Stamicarbon B. V., Geleen, Netherlands

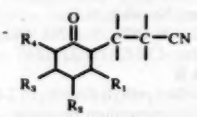
Filed Dec. 12, 1974, Ser. No. 532,294

Claims priority, application Netherlands, Dec. 15, 1973, 7317228

Int. Cl.² C07D *215/00*

U.S. Cl. 260—283 SY **4 Claims**

1. A process for preparing quinolines, consisting essentially of contacting a vaporized compound of the formula



wherein each of R_1, R_2, R_3 and R_4 is the same or different and is a hydrogen atom or an alkyl group of 1 to 4 carbon atoms, wherein the summation of carbon atoms of the groups R_1, R_2, R_3 and R_4 is no greater than 10, at elevated temperatures with a dehydrogenation catalyst in the presence of hydrogen in two stages, wherein in a first stage (1) said vaporized compound is contacted with a dehydrogenation catalyst at a temperature ranging between 185° to 220° C to form a vaporized mixture of products and in a second stage (2) said mixture is contacted with the catalyst in the presence of hydrogen at a higher temperature than that of stage (1) and being between 260° and 300° C, wherein the mixture of products includes water, and wherein said water is removed prior to undertaking step (2).

4,028,363

ISOQUINOLINE DERIVATIVES

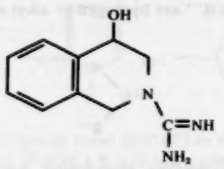
Robert John Francis, Harpenden, and John Glyn Allen, St. Albans, both of England, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Mar. 3, 1976, Ser. No. 663,385

Int. Cl.² C07D *217/24*

U.S. Cl. 260—286 R **2 Claims**

1. 2-Amidino-4-hydroxy-1,2,3,4-tetrahydroisoquinoline characterized by the formula



or a pharmaceutically acceptable acid addition salt thereof.

4,028,364

2-AZABICYCLO[2.2.2.]OCTAN-2-YL-DIPHENYL-ALKANONES AND RELATED COMPOUNDS

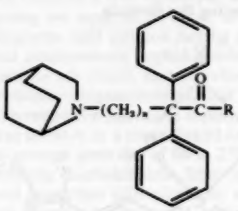
Gilbert William Adelstein, Evanston, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Filed July 6, 1976, Ser. No. 703,041

Int. Cl.² C07D *453/02*

U.S. Cl. 260—293.54 **2 Claims**

1. A compound of the general formula



(I)

wherein R is an alkyl radical containing from 1 to 6 carbon atoms and *n* is an integer from 1 to 3.

4,028,365

BENZ[g]INDOLYL COMPOUNDS

John Frederick Cavalla, Isleworth, and John Leheup Archibald, Windsor, both of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

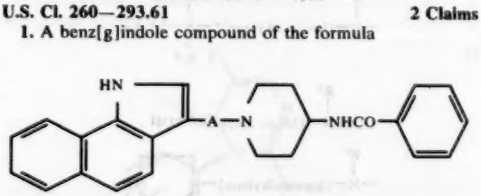
Continuation-in-part of Ser. No. 323,684, Jan. 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 175,345, Aug. 26, 1971, abandoned. This application Nov. 15, 1974, Ser. No. 524,005

Claims priority, application United Kingdom, Sept. 3, 1970, 42090/70; July 22, 1971, 34376/71

Int. Cl.² C07D *471/02*

U.S. Cl. 260—293.61 **2 Claims**

1. A benz[g]indole compound of the formula



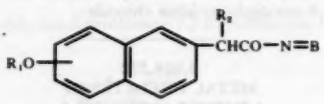
where A is lower alkylene of 1 to 4 carbon atoms, and the pharmaceutically acceptable acid addition salts thereof.

4,028,366
2-NAPHTHYL-LOWER-ALKANOYLAMINES

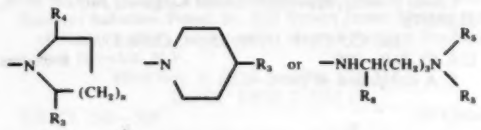
Bernard L. Zenitz, Colonie, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 542,546, Jan. 20, 1975, Pat. No. 4,005,093. This application June 1, 1976, Ser. No. 691,630
Int. Cl.² C07D 211/16
U.S. Cl. 260—293.62 **8 Claims**

1. A compound having the formula:



where R_1 and R_2 each represent hydrogen or lower-alkyl and N=B represents one of the groups



where R_3 represents lower-alkyl, cyclohexyl or cyclohexyl-lower-alkyl; R_4 and R_6 represent hydrogen or lower-alkyl; R_5 represents lower-alkyl; and *n* represents one of the integers 1, 2 and 3.

4,028,367
HIGH EFFICIENCY STABLE AQUEOUS RESOLES

Harold P. Higginbottom, Wilbraham, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed Mar. 10, 1975, Ser. No. 556,596
Int. Cl.² C08L 61/06
U.S. Cl. 260—29.3 **14 Claims**

1. An aqueous solution of a resole wherein the solution has a pH in the range 6 to 8.5 and contains less than 2 percent of free phenol and less than 2 percent of free formaldehyde based on the weight of the resole and wherein the resole has a number average molecular weight of less than 300, a water tolerance between about 100 and 800 and a combined formaldehyde to phenol molar ratio in the range of 2.0:1 to 2.9:1 and contains sufficient methylolated 2,2′- and 2,4′-dihydroxydiphenylmethanes to inhibit crystal formation in the resole solution said resole being the product of:

a. reacting 1.0 mole phenol with from 0.05 to 0.03 moles formaldehyde under conditions for formation of novolac resin,

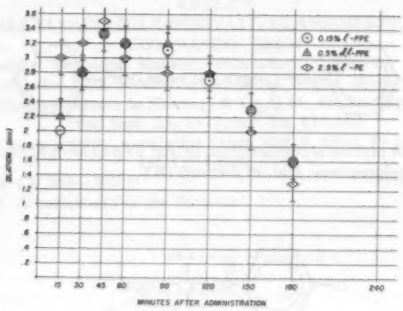
b. adding from 1.75 to 3.5 moles formaldehyde and reacting under basic conditions to produce a resole of molecular weight less than 300, and containing less than 2 weight percent free phenol, and

c. adjusting the pH of the aqueous resole to between about 6 and 8.5.

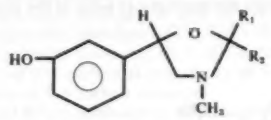
4,028,368
NOVEL INTERMEDIATES USEFUL IN THE SYNTHESIS OF OPTICALLY ACTIVE M-ACYLOXY-α-[(METHYLAMINO)METHYL]BENZYL ALCOHOLS

Nicolae S. Bodor, and Sun-Shine Yuan, both of Lawrence, Kans., assignors to Interx Research Corporation, Lawrence, Kans.

Division of Ser. No. 548,606, Feb. 10, 1975, Pat. No. 3,966,749. This application Mar. 29, 1976, Ser. No. 671,067
Int. Cl.² C07D 263/06
U.S. Cl. 260—295 R **3 Claims**



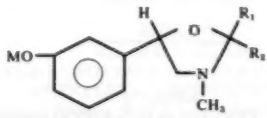
1. The intermediate compound:



(II)

wherein R_1 and R_2 which can be the same or different represent a member selected from the group consisting of a hydrogen atom, a C_1–C_{10} alkyl group or a di(C_1–C_2)alkylamino(C_1–C_{10})alkyl group.

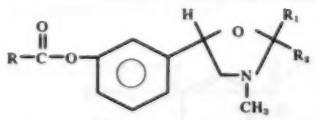
2. The intermediate compound:



(III)

wherein R_1 and R_2 which may be the same or different represent a hydrogen atom, a C_1–C_{10} alkyl group, or a di(C_1–C_2)alkylamino(C_1–C_{10}) alkyl group; and wherein M represents an alkali or alkaline earth metal or thallium.

3. The intermediate compound:



(IV)

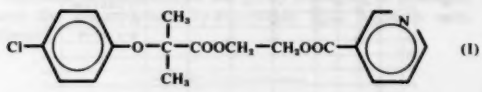
wherein R represents a member selected from the group consisting of a straight or branched alkyl group of from one to twenty carbon atoms, an ethoxycarbonyl group, a benzyloxycarbonyl group, a phenyl group, a 2-pyridyl group, a 3-pyridyl group or a 4-pyridyl group, and wherein R_1z and R_2, which may be the same or different, represent a hydrogen atom, a C_1–C_{10} alkyl group or a di(C_1–C_2)alkylamino(C_1–C_{10})alkyl group.

4,028,369
PREPARATION OF GLYCOL (2-(P-CHLOROPHENOXY)-2-METHYLPROPIONATE)-2-NICOTINATE

Carlos Sunkel Letelier, Olvega, and Fernando Cillero Grafulla, Ferraz, both of Spain, assignors to Alter S.A., Madrid, Spain

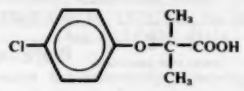
Filed Aug. 4, 1975, Ser. No. 601,865
Claims priority, application Spain, June 4, 1975, 438245
Int. Cl.² C07D 213/55
U.S. Cl. 260—295.5 R 5 Claims

1. A process for the preparation of glycol 2-(p-chlorophenoxy)-2-methylpropionate nicotinate, of formula (I):



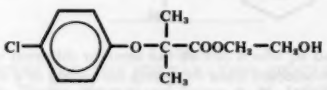
(I)

which process is characterized in that 2-(p-chlorophenoxy)-2-methylpropionic acid, of formula (II):



(II)

is reacted with ethylene oxide at a temperature of up to about 60° C in an inert solvent in the presence of a zinc chloride as a catalyst, to prepare the monoglycol ester of the acid (II), of formula (III):



(III)

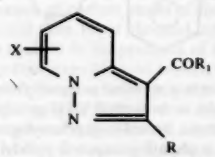
which is in turn reacted with nicotinic acid chloride in an inert solvent and in the presence of a base at a temperature of up to about 60° C, to prepare the final product, of formula (I).

4,028,370
NOVEL PYRAZOLO [1,5-A]PYRIDINES

Tsutomu Irikura, Tokyo, Japan, assignor to Kyorin Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Oct. 17, 1975, Ser. No. 623,311
Claims priority, application Japan, Nov. 1, 1974, 49-126319
Int. Cl.² C07D 487/00
U.S. Cl. 260—296 H 6 Claims

1. A compound of the general formula:



wherein X is hydrogen or methyl; R is dialkylamino or alkyleneimino; and R_1 is different from R and is hydrogen, straight or branched lower alkyl, or lower alkoxy alkyl.

4,028,371
THE COMPOUND 1,3,4-TRIMETHYL-1-(3,4,5-TRIMETHOXYBENZYL)-1,2,5,6-TETRAHYDROPYRIDINE CHLORIDE

Ricardo Granados Jarque; Juan Bosch Cartes; Jorge Canals Cabiro, all of Barcelona; Cristobal Martinez Roldan, and Fernando Rabadan Peinado, both of Madrid, all of Spain, assignors to Laboratorios Made, S.A., Spain

Division of Ser. No. 569,193, April 17, 1975, abandoned. This application Mar. 1, 1976, Ser. No. 662,577
Claims priority, application Spain, May 4, 1974, 425970
Int. Cl.² C07D 211/00
U.S. Cl. 260—297 R 1 Claim

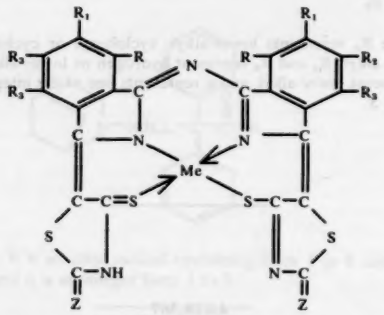
1. The compound 1,3,4-trimethyl-1-(3,4,5-trimethoxybenzyl)-1,2,5,6-tetrahydropyridine chloride.

4,028,372
METAL CHELATES OF 1-IMINO-3-(4-THIOXO-5-THIAZOLIDINYLIDENE)ISOINDOLINES

Nathan N. Crounse, and Nicholas A. Ambrosiano, both of Cincinnati, Ohio, assignors to Sterling Drug Inc., New York, N.Y.

Continuation-in-part of Ser. No. 496,078, Aug. 9, 1974, Pat. No. 3,966,753. This application Nov. 19, 1975, Ser. No. 633,246
Claims priority, application United Kingdom, July 28, 1975, 31506/75
Int. Cl.² C07F 15/00, 15/04; C09B 57/00
U.S. Cl. 260—299 9 Claims

1. A compound of the formula



in which R, R_1, R_2 and R_3 are the same or different and are selected from the class consisting of hydrogen, alkyl having one to three carbon atoms, alkoxy having one to three carbon atoms, halo, trifluoromethyl, phenyl and phenyl substituted by alkyl having one to three carbon atoms, alkoxy having one to three carbon atoms or halogen; Me is a metal selected from the class consisting of copper, cobalt and nickel; and Z is oxygen or sulfur.

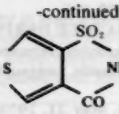
4,028,373
THIOPHENE SACCHARINES

Otto Hromatka, and Dieter Binder, both of Wien, Austria, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Sept. 2, 1975, Ser. No. 609,623
Claims priority, application Austria, Sept. 16, 1974, 7448/74; Sept. 16, 1974, 7449/74; Sept. 16, 1974, 7450/74
Int. Cl.² C07D 513/04
U.S. Cl. 260—301 8 Claims

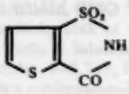
1. Thiophene saccharines of the formulae 2,3-dihydro-3-oxothieno-[3,4-d]-isothiazole-1,1-dioxide

-continued



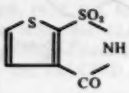
I.

2,3-dihydro-3-oxothieno-[2,3-d]-isothiazole-1,1-dioxide



II and

and 2,3-dihydro-3-oxothieno-[3,2-d]-isothiazole-1,1-dioxide



III

and their non-toxic water-soluble salts.

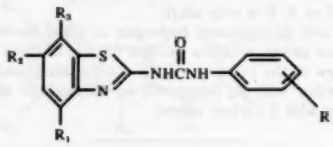
4,028,374

ANTIBACTERIAL THIOCYANATOBENZOTHIAZOLES

Stanford Salvatore Pelosi, Jr., and Robert James Alaimo, both of Norwich, N.Y., assignors to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,314
Int. Cl.² C07D *277/82*
U.S. Cl. 260—305 **10 Claims**

1. A compound of the formula:



wherein R is hydrogen, 4-bromo, 4-chloro, 4-flouro, 3,4-dichloro, or 4-nitro; R_1 is methoxy or thiocyanato; R_2 is n-butyl, chloro, methyl, or thiocyanato; R_3 is hydrogen or chloro and at least one of R_1 and R_2 is thiocyanato.

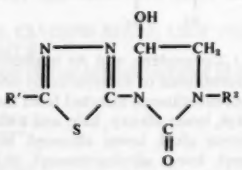
4,028,375

THIADIAZOLYLIMIDAZOLIDINONES

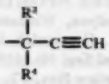
John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Aug. 5, 1974, Ser. No. 494,441
The portion of the term of this patent subsequent to Aug. 26, 1992, has been disclaimed.
Int. Cl.² C07D *417/00*
U.S. Cl. 260—306.8 D **8 Claims**

1. A compound of the formula



wherein R′ is selected from the group consisting of lower alkyl, lower alkenyl, lower haloalkyl, lower alkoxy, lower alkylthio, lower alkylsulfonyl and lower alkylsulfinyl; and R^2 is selected from the group consisting of lower alkenyl, lower chloroalkenyl, lower bromoalkenyl, and



wherein R^3 and R^4 are selected from the group consisting of hydrogen and alkyl of up to three carbon atoms.

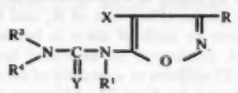
4,028,376

3-ALKYLISOXAZOLE DERIVATIVES AND HERBICIDES CONTAINING THEM

Hisajiro Yukinaga, Kusatsu; Shinzaburo Sumimoto; Ichiro Ishizuka, both of Osaka, and Jitsuo Sugita, Ikeda, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed Sept. 23, 1975, Ser. No. 615,883
Claims priority, application Japan, Oct. 4, 1974, 49-114839
Int. Cl.² C07D *1/14*
U.S. Cl. 260—307 H **11 Claims**

1. A compound of the formula



wherein R represents alkyl of 3–6 carbon atoms or cycloalkyl of 3–6 carbon atoms,

R^1 represents hydrogen or alkyl of 1–6 carbon atoms,

R^3 represents hydrogen or alkyl of 1–6 carbon atoms,

R^4 represents hydrogen, alkyl of 1–6 carbon atoms, alkenyl of 2–7 carbon atoms, alkoxy of 1–6 carbon atoms or alkylthio of 1–6 carbon atoms, or

R^3 and R^4 are combined to form, together with the nitrogen atom to which they are attached, morpholino, pyrrolidino or piperidino,

X represents hydrogen or halogen, and

Y represents oxygen or sulfur, or

R and X are combined to form alkylene of 3–6 carbon atoms.

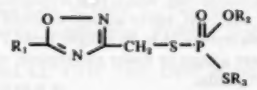
4,028,377

O,S-DIALKYL- AND O-ALKYL-S-ALKOXYALKYL-S-1,2,4-OXA-DIAZOLYL-3-METHYLENE DITHIOPHOSPHATES

Willy Meyer, Riehen; Beat Böhner, Binningen; Dag Dawes, Muttenz, and Kurt Rüfenacht, Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 23, 1974, Ser. No. 517,359
Claims priority, application Switzerland, Nov. 2, 1973, 15460/73; Nov. 2, 1973, 15461/73; Aug. 16, 1974, 11260/74
Int. Cl.² C07F *9/165*
U.S. Cl. 260—307 G **19 Claims**

1. A compound of the formula



wherein

R_1 represents unsubstituted C_1–C_4-alkyl, benzyl or phenyl,

R_2 represents methyl or ethyl, and

R_3 represents unsubstituted C_3–C_5-alkyl optionally interrupted by oxygen.

10. O-Ethyl-S-allyl-S-(5-methyl-1,2,4-oxadiazole-methylene (3))-dithiophosphate.

4,028,378
FATTY AND BENZOIC ACID ESTERS OF ETHOXYLATED HYDANTOINS SUBSTITUTED OR NOT IN THE 5-POSITION

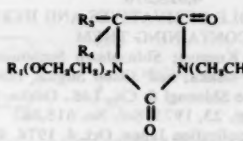
Donald Edward MacFadyen, Williamsport, Pa., assignor to Glyco Chemicals, Inc., Greenwich, Conn.

Continuation-in-part of Ser. No. 419,497, Nov. 27, 1973, abandoned. This application Nov. 17, 1975, Ser. No. 632,320

Int. Cl.² C07D *233/72*

U.S. Cl. 260—309.5 **32 Claims**

1. Esters of 1,3-dihydroxyethyl group-containing-hydantoins having the structural formula



wherein each of R_3 and R_4 separately is hydrogen, lower alkyl, cycloalkyl, or alkoxy and when either or each of R_3 and R_4 is alkyl, cycloalkyl or alkoxy, they jointly have at most 7 carbons, or R_3 and R_4 jointly are the divalent tetramethylene or pentamethylene chain; either one of R_1 and R_2 is hydrogen, and the other one or each of them is benzoyl, isostearoyl, oleoyl, linoleoyl, linolenoyl, or saturated fatty acyl having from 2 to about 22 carbons or a mixture of saturated fatty acyl groups having from 8 to about 22 carbons or a mixture of any of said saturated fatty acyl groups with any of oleoyl, linoleoyl and linolenoyl, palmitoleoyl and myristoleoyl; and each of *x* and *y* varies from each of them being 1 to their sum averaging from 2 to about 100; and mixtures of any of said esters.

4,028,379
PROCESS FOR PREPARING 2-AMINO-2-ALKYLTHIO-1-NITROETHYLENE COMPOUNDS

George Raymond White, Harpenden, England, assignor to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

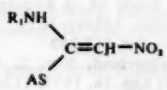
Filed May 5, 1976, Ser. No. 683,355

Claims priority, application United Kingdom, May 15, 1975, 20628/75

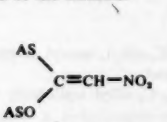
Int. Cl.² C07D *233/64*

U.S. Cl. 260—309 **4 Claims**

1. A process for the production of a compound of the formula:



wherein A is lower alkyl; R_1 is lower alkyl, lower alkoxy, 2,2,2-trifluoroethyl, $(CH_2)_nR_2$ or $HetCH_2Z(CH_2)_n$; Het is an imidazole, thiazole, pyridine, isothiazole, oxazole, isoxazole, triazole or thiadiazole ring, which ring is optionally substituted by lower alkyl, hydroxyl, lower alkoxy, chlorine or bromine, Z is sulphur or methylene; *n* is an integer from 1 to 12; and R_2 is hydroxy, lower alkoxy or lower alkylamino; wherein a compound of the formula:



is reacted with an amine of formula R_1NH_2.

4,028,380
HYDRAZINO-IMIDAZOLE DERIVATIVES

Harm Jan Panneman, and Antonius Hermanus Nicolaas Maria Bruins, both of Oss, Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

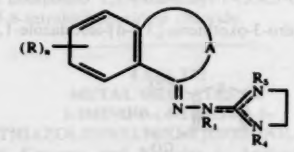
Division of Ser. No. 579,633, May 21, 1975. This application Dec. 10, 1975, Ser. No. 639,495

Claims priority, application Netherlands, June 1, 1974, 74.07469

Int. Cl.² C07D *233/50*

U.S. Cl. 260—309.6 **6 Claims**

1. A compound of the formula:



or a pharmaceutically acceptable acid addition salt thereof, in which the dotted lines mean one extra bond starting from the (guanidine-) carbon atom to one of the adjacent nitrogen atoms, and

A represents methylene, ethylene, propylene or butylene, which groups may optionally be substituted with alkyl having 1 to 4 carbon atoms;

R represents hydroxy, alkyl having 1 to 4 carbon atoms, alkylthio or alkoxy having 1 to 4 carbon atoms, halogen, trifluoromethyl, nitro, amino, hydroxymethyl, lowr alkanoyloxy, or a methylenedioxy group, the latter insofar as n is the number 2 and two adjacent carbon atoms atoms of the benzo ring are involved;

n is the number 0, 1, 2, 3 or 4 with the proviso that where n is 3 or 4, R is only alkyl;

R_1, R_4 and R_5 represent hydrogen or alkyl having 1 to 4 carbon atoms, with the proviso tht one of them is absent in view of the presence of the double bond; and wherein

R_2 together with R_3 represents an alkylene or alkenylene group with 2 carbon atoms.

4,028,381
PYRAZOLOBENZAZEPINES

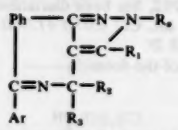
Heinz Werner Gschwend, New Providence, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 574,211, May 5, 1975, which is a continuation-in-part of Ser. No. 475,474, June 3, 1974, Pat. No. 3,947,585. This application Apr. 13, 1976, Ser. No. 676,609

Int. Cl.² C07D *471/00*

U.S. Cl. 260—310 R **6 Claims**

1. A compound of the formula



wherein Ph is 1,2-phenylene and Ar is phenyl, both of said radicals are unsubstituted or substituted by one or two, of the same or different substituents selected from the group consisting of lower alkyl, lower alkoxy, halo and trifluoromethyl, R_6 is hydrogen, lower alkyl, lower alkanoyl, lower alkoxycarbonyl, carbamoyl, lower alkylcarbamoyl, di-lower alkylcarbamoyl, hydroxy-lower alkyl, lower alkoxy-lower alkyl, amino-lower alkyl, lower alkylamino-lower alkyl, di-lower alkylamino-lower alkyl, Ar or Ar-lower alkyl, wherein the additional chain-nitrogen or oxygen atom is separated from

the ring-nitrogen by at least 2 carbon atoms, each of R_1 and R_2 is hydrogen or lower alkyl, and R_3 is hydrogen, lower alkyl, hydroxy or lower alkanoyloxy; or N-oxides thereof; or pharmaceutically acceptable acid addition salts thereof.

4,028,382
9-BENZOYL,3-HYDROXYMETHYL-1,2,3,4-TETRAHYDRO-CARBAZOLE

Ernest John Alexander, East Greenbush, and Aram Mooradian, Schodack, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 640,249, Dec. 12, 1975, Pat. No. 4,001,270, which is a continuation-in-part of Ser. No. 514,767, Oct. 15, 1974, Pat. No. 3,948,939, which is a continuation-in-part of Ser. No. 314,099, Dec. 11, 1972, Pat. No. 3,905,998, which is a continuation-in-part of Ser. No. 200,205, Nov. 18, 1971, Pat. No. 3,758,496, which is a continuation-in-part of Ser. No. 42,620, June 2, 1970, Pat. No. 3,687,969. This application June 24, 1976, Ser. No. 699,383

Int. Cl.² C07D *209/86*

U.S. Cl. 260—315 **1 Claim**

1. 9-Benzoyl-3-hydroxymethyl-1,2,3,4-tetrahydrocarbazole.

4,028,383
INDOLOPYRONES HAVING ANTIALLERGIC ACTIVITY

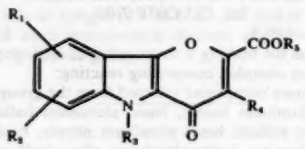
Richard E. Brown, Hanover, and Paul C. Unangst, Hackettstown, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Sept. 8, 1975, Ser. No. 611,453

Int. Cl.² C07D *491/04*; A61K *31/40*

U.S. Cl. 260—326.29 **7 Claims**

1. A substituted indolopyrone of the formula:



wherein R_1 and R_2 may be hydrogen, hydroxy, lower alkoxy or lower alkyl, halogen, trifluoromethyl, or taken together to form a methylenedioxy group;

R_3 may be hydrogen, lower alkyl, phenyl;

R_4 may be hydrogen, lower alkyl of 1 to 6 carbon atoms; and

R_5 may be hydrogen or lower alkyl.

4,028,384
PROCESS FOR THE PREPARATION OF ORGANIC SILICON COMPOUNDS

Hans-Joachim Vahlensieck, Wehr; Claus-Dieter Seiler, and Hans-Joachim Kötzsch, both of Rheinfelden, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Continuation of Ser. No. 58,189, July 24, 1970, abandoned. This application Nov. 23, 1973, Ser. No. 418,793

Claims priority, application Germany, July 25, 1969, 1937904

Int. Cl.² C07D *307/12*; C07F *7/02*

U.S. Cl. 260—347.8 **20 Claims**

1. In the process of hydrosilylation with a hydrogen silane of the formula:

$$H_aSi\,R_b\,X_{4-(a+b)}$$

wherein *a* is 1 or 2;

b is 0 or 1;

X is alkoxy, cycloalkoxy, aryloxy, or halo; and R is alkoxy cycloalkoxy, aryloxy, halo, alkyl, cycloalkyl or aryl with an organic compound containing carbon to carbon aliphatic unsaturation; the improvement which comprises catalyzing said hydrosilylation reaction with a platinum complex compound of the formula:

$$[Pt\,R^1\,Cl_2]_a$$

wherein *a* is 1 or 2; and R^1 is an olefinically unsaturated ketone selected from the group consisting of butenone, phorone, isophorone, dibenzalacetone and mesityl oxide.

4,028,385
PROCESS FOR PREPARING STEREOSPECIFIC FARNESYLACETIC ACID AND ESTER THEREOF

Yoshiji Fujita, Kurashiki; Yoshiaki Omura, Okayama; Takashi Nishida, and Kazuo Itoi, both of Kurashiki, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

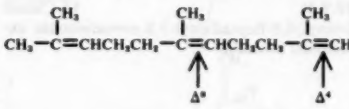
Filed Aug. 18, 1975, Ser. No. 605,455

Claims priority, application Japan, Sept. 2, 1974, 49-100631; Sept. 2, 1974, 49-100632; Sept. 2, 1974, 49-100633; Sept. 2, 1974, 49-100634; Sept. 2, 1974, 49-100635

Int. Cl.² C11C *3/02*, *1/00*

U.S. Cl. 260—410 **15 Claims**

1. A process for preparing a stereospecific farnesylacetic acid or ester thereof, at Δ^4 and Δ^8 positions, having the formula:



wherein R_2 represents hydrogen atom, a lower alkyl radical having 1 to 6 carbon atoms, a lower cycloalkyl radical having 3 to 6 carbon atoms, a lower alkenyl radical having 2 to 6 carbon atoms or a lower cycloalkenyl radical having 3 to 6 carbon atoms, which comprises rectifying a stereo isomeric mixture of farnesylacetic acids or esters thereof in a rectification column having from 10 to 100 theroretical plates and with a reflux ratio of from 2 to 100; said stereo isomeric mixture being one of the following mixtures:

i. a mixture of $\Delta^{4,8}$-cis- and Δ^4-trans-Δ^8-cis-farnesylacetic acids or esters thereof,

ii. a mixture of ^{4,8}-trans- and ^{4}-cis-^{8}-trans-farnesylacetic acids or esters thereof, or

iii. a mixture of four isomers of $\Delta^{4,8}$-cis-, Δ^4-trans-Δ^8-cis-, Δ^4-cis-Δ^8-trans- and $\Delta^{4,8}$-trans-farnesylacetic acids or esters thereof,

to separate each stereospecific farnesylacetic acid or ester thereof from the mixture of (i) or (ii), or to separate $\Delta^{4,8}$-trans- or $\Delta^{4,8}$-cis-farnesylacetic acid or ester thereof from the mixture of (iii).

4,028,386
NOVEL β-KETONE COMPOUNDS

Daniel Hainaut, Villemomble, and Jean-Pierre Demoute, Montreuil-sous-Bois, both of France, assignors to Roussel-UCLAF, Paris, France

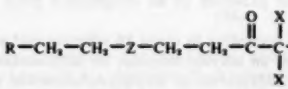
Filed Sept. 3, 1974, Ser. No. 502,635

Claims priority, application France, Sept. 24, 1973, 73.34076

Int. Cl.² C11C *3/02*; C07C *69/66*

U.S. Cl. 260—410.9 R **7 Claims**

1. A compound of the formula



wherein R is a linear or branched alkyl of 4 to 10 carbon atoms, linear or branched alkenyl of 4 to 10 carbon atoms and alkoxyalkyl of 5 to 13 carbon atoms Z is selected from the group consisting of —CH=CH—, —CHOH—CH=CH—,

and —OCH_2—, X is selected from the group consisting of hydrogen and methyl, Y is linear and branched alkoxy of 1 to 5 carbon atoms.

4,028,387

(1-METHYL-2-VINYL)4,6-HEPTADIENYL-3,8-NONADIENOATE AND A METHOD OF MANUFACTURING THE SAME

Satoru Enomoto, Fujisawa; Hitoshi Takita, Tokyo; Hisayuki Wada, Tokyo; Yutaka Mukaida, Tokyo, and Mikiro Yanaka, Matsudo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

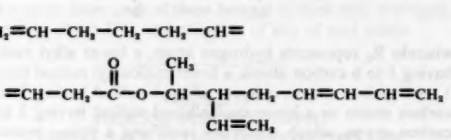
Filed Sept. 10, 1975, Ser. No. 612,082

Claims priority, application Japan, Sept. 18, 1974, 49-106628; Sept. 18, 1974, 49-106630

Int. Cl.² C11C 3/02; C07C 69/52

U.S. Cl. 260—410.9 N **12 Claims**

1. (1-methyl-2-vinyl)4,6-heptadienyl-3,8-nonadienoate expressed by the chemical formula:



4,028,388

PREPARATION OF ACIDS

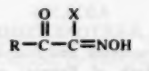
Roger G. Duranleau, Ardonia, and John M. Larkin, Wappingers Falls, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Jan. 8, 1976, Ser. No. 647,399

Int. Cl.² C07C 53/22, 53/08

U.S. Cl. 260—413 **20 Claims**

1. A method of preparing a carboxylic acid which comprises heating an acylhydroximyl halide corresponding to the formula:



where R is an alkyl group of from 1 to 50 carbon atoms and where X is Cl, Br, I or F in the presence of at least greater than 5 moles of water per mole of said halide at a temperature of about 70° to 220° C.

3. A method according to claim **1** wherein said heating is conducted in the presence of catalytic amounts of a mineral acid.

16. A method according to claim **1** wherein said heating is conducted in the presence of an oxygenated polar organic solvent.

17. A method according to claim **16** wherein said solvent is an alkanoic acid, an alkylformamide, an alkylacetamide, an alkylsulfoxide, an alkylurea, an alkylphosphoramide, an alkylpyrrolidinone, an aldehyde, a ketone or an ether.

4,028,389

METALLOCENES AND METALLOCENE DERIVATIVES HAVING A RADIOACTIVE CENTRAL ATOM

Martin Wenzel, and Detlef Langheim, both of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

Filed Sept. 21, 1973, Ser. No. 399,552

Claims priority, application Germany, Sept. 21, 1972, 2246460

Int. Cl.² C07F 17/02, 17/00

U.S. Cl. 260—429 CY **14 Claims**

1. A process for the production of metallocenes or metallocene derivatives with a radioactive central atom, which comprises heating at 150°–200° C. for 0.1–3 hours a non-radioactive metallocene or metallocene bearing a substituent selected from the group consisting of —COOH, —COO-alkyl, $CONH_2$, alkanoyl, halogen, amino or dialkylamino wherein alkyl and alkanoyl in each instance are of 1–8 carbon atoms on at least one cyclopentadienyl radical, with a radioactive metal nuclide selected from Group VIII and Subgroups VI and VII of the Periodic Table which is capable for forming a metallocene in ionic form and thereafter separating the thus-obtained radioactive metallocene or metallocene derivative from the ionic radioactive starting material.

4,028,390

METHODS OF MAKING BASIC ZIRCONIUM COMPLEXES

Andrew M. Rubino, New Providence; John L. Jones, Watchung, and Edward S. Bretschneider, Plainfield, all of N.J., assignors to Armour Pharmaceutical Company, Phoenix, Ariz.

Filed Mar. 26, 1975, Ser. No. 562,300

Int. Cl.² C07F 7/00

U.S. Cl. 260—429.3 **14 Claims**

1. A process for making a water soluble, astringent aluminum-zirconium complex comprising reacting:

a. an aluminum compound selected from the group consisting of aluminum halide, basic aluminum halide, basic aluminum sulfate, basic aluminum nitrate, basic aluminum sulfamate, basic aluminum phenolsulfonate, and mixtures thereof; and

b. a freshly prepared basic zirconium compound comprising a basic zirconium-amino acid gel, said compounds being added in such amounts as to yield in the complex an Al/Zr mole ratio of about 10:1 to 1:10.

13. A process for making a water soluble, astringent zirconium complex comprising reacting in aqueous solution:

a. a zirconium compound selected from the group consisting of zirconium oxy salts, zirconium hydroxy salts, trioxodizirconyl hydroxy salts, and mixtures thereof;

b. a freshly prepared basic zirconium compound comprising a basic zirconium-amino acid gel; and

c. a buffer such that a stable solution containing five to twenty weight percent of the complex will have a pH above about 3.

4,028,391

METHOD OF PREPARING ORGANOSILICON CARBOXYLATES

Kevin M. Foley, Hebron, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation-in-part of Ser. No. 428,279, Dec. 26, 1973, abandoned. This application Jan. 6, 1975, Ser. No. 538,661

Int. Cl.² C07F 7/08

U.S. Cl. 260—448.2 D **1 Claim**

1. A coupling agent for glass fibers comprising from 95 to 50 weight percent pentane and from 5 to 50 weight percent of an organosilane having the formula

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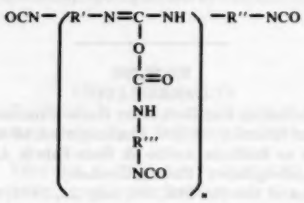
4,028,392

ISOCYANATE PREPOLYMERS

Shinsaku Ogawa; Akira Ide; Kazurou Komatsu; Sojiro Matsumoto, and Yasushi Kishimoto, all of Nebeoka, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed May 20, 1975, Ser. No. 579,180
Claims priority, application Japan, May 20, 1974, 49-56355
Int. Cl.² C07C *119/042, 119/045, 119/048*
U.S. Cl. 260—453 AR 6 Claims

1. An isocyanate prepolymer represented by the formula



wherein *n* is an integer of 1 to 6; R′, R″ and R‴ may be the same and each represents a divalent aliphatic, araliphatic, aromatic or acyclic group.

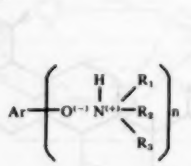
4,028,393

PROCESS FOR THE PRODUCTION OF POLYFUNCTIONAL CYANIC ACID ESTERS

Günther Rottloff, Cologne; Rudolf Sundermann, Leverkusen; Ernst Grigat, Odenthal-Gloebusch, and Rolf Putter, Duesseldorf, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Feb. 17, 1976, Ser. No. 658,814
Claims priority, application Germany, Feb. 22, 1975, 2507671; July 2, 1975, 2529486
Int. Cl.² C07C *122/00*
U.S. Cl. 260—453 P 4 Claims

1. A process for the production of a polyfunctional aromatic cyanic acid ester which comprises reacting an excess of a cyanogen halide, in the presence of a trialkyl amine and an organic solvent with a di- or poly-trialkyl ammonium phenolate of the formula:



in which

Ar represents an optionally substituted aromatic radical,

R_1, R_2 and R_3 are the same or different and each represents a linear or branched alkyl radical, and

n is a number from 2 to 6.

4,028,394

ANTIBACTERIAL AND FUNGICIDAL S-PHENYLTHIOCARBAMATES

Kenneth S. Karsten, Westport, and Joseph V. Karabinos, Orange, both of Conn., assignors to R. T. Vanderbilt Company, Inc., Norwalk, Conn.

Continuation-in-part of Ser. No. 425,251, Dec. 17, 1973, abandoned. This application Aug. 5, 1975, Ser. No. 602,077
Int. Cl.² C07C *155/02*
U.S. Cl. 260—455 A 10 Claims

1. The compound 2-hydroxyphenyl N-(3,4-dichlorophenyl)-thiocarbamate.

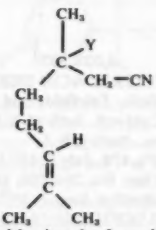
4,028,395

METHOD FOR THE PREPARATION OF OCTENE-NITRILE ORGANIC COMPOUNDS AND COMPOUNDS OBTAINED THEREBY

Aldo Prevedello, and Edoardo Platone, both of San Donato Milanese (Milan), Italy, assignors to Snam Progetti, S.p.A., San Donato, Milanese, Italy

Filed Oct. 30, 1975, Ser. No. 627,349
Claims priority, application Italy, Oct. 30, 1974, 28956/74
Int. Cl.² C07C *121/30, 121/34*
U.S. Cl. 260—465.4 1 Claim

1. Octenenitrile organic compounds having the structural formula:



wherein Y is a radical having the formula —O—CO—CH_3.

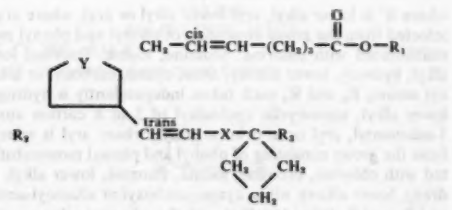
4,028,396

16,16-SPIROCYCLOALKYL PROSTAGLANDIN DERIVATIVES

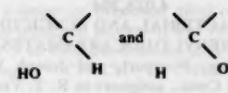
Robert Eugene Schaub, Upper Saddle River, and Martin Joseph Weiss, Oradell, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed July 2, 1975, Ser. No. 592,494
Int. Cl.² C07C *177/00*
U.S. Cl. 260—468 D 31 Claims

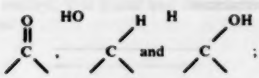
1. A compound selected from the group consisting of an optically active compound of the formula:



and a racemic compound of that formula and the mirror image thereof wherein X is a divalent radical selected from the group consisting of those of the formulae:



Y is a divalent radical selected from the group consisting of those of the formulae:



R_1 is hydrogen or alkyl having up to 4 carbon atoms; R_2 is hydrogen or hydroxy; and R_3 is 2-cis-alkenyl having 4 or 5 carbon atoms or 2-alkynyl having 4 or 5 carbon atoms; and the pharmacologically acceptable cationic salts thereof when R_1 is hydrogen.

4,028,397

HYDROXYCITRIC ACID DERIVATIVES

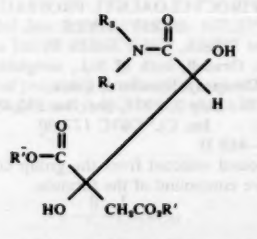
Robert William Guthrie, Fairfield, and Richard Wightman Kierstead, North Caldwell, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 376,478, July 5, 1973, Pat. No. 3,919,254, which is a division of Ser. No. 204,288, Dec. 2, 1971, Pat. No. 3,767,678. This application Aug. 1, 1975, Ser. No. 600,995

Int. Cl.² C07C *103/167, 103/37*

U.S. Cl. 260—468 G **2 Claims**

1. A compound of the formula



where R′ is lower alkyl, aryl lower alkyl or aryl, where aryl is selected from the group consisting of phenyl and phenyl monosubstituted with chlorine, bromine, iodine, fluorine, lower alkyl, hydroxy, lower alkoxy, nitro, cyano, carboxyl or alkanoyl amino; R_3 and R_4 each taken independently is hydrogen, lower alkyl, monocyclic cycloalkyl of 3 to 8 carbon atoms, 1-adamantyl, aryl or aryl lower alkyl, where aryl is selected from the group consisting of phenyl and phenyl monosubstituted with chlorine, bromine, iodine, fluorine, lower alkyl, hydroxy, lower alkoxy, nitro, cyano, carboxyl or alkanoyl-amino; and R_3 and R_4 taken together with the adjacent nitrogen atom form a 5- or 6-membered heterocyclic ring which may contain one additional heteroatom selected from the group consisting of nitrogen and oxygen.

4,028,398

PROCESS FOR SUBSTITUTED CYCLOHEXENES AND ITS PRODUCTS

Gerhard Satzinger, Cundelfingen, and Gustav Hechtfischer, Freiburg-Landwasser, both of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

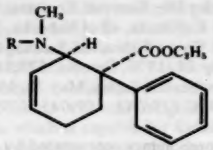
Continuation of Ser. No. 374,205, June 27, 1973, abandoned. This application Oct. 20, 1975, Ser. No. 623,837

Claims priority, application Germany, Feb. 17, 1970, 2007215

Int. Cl.² C07C *101/42*

U.S. Cl. 260—471 A **8 Claims**

1. A compound of the formula:



II

and its pharmaceutically acceptable salts wherein R is lower alkenyl of 3 to 5 carbon atoms, benzyl, phenethyl, or β-morpholinoethyl.

4,028,399

CARBAMATE

Albrecht Zschocke, Bad Durkheim; Horst Kummer, Ludwigshafen, and Heinrich Adolphi, Limburgerhof, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation of Ser. No. 500,150, Aug. 23, 1974, abandoned, which is a continuation-in-part of Ser. No. 26,747, April 8, 1970, abandoned. This application Feb. 17, 1976, Ser. No. 658,408

Claims priority, application Germany, Apr. 18, 1969, 1919747

Int. Cl.² C07C *125/06*

U.S. Cl. 260—479 C **1 Claim**

1. 3,5-diethylphenyl-N-methylcarbamate.

4,028,400

D-HOMOSTEROIDS

Leo Alig, 76 Heidenlochstrasse, Liestal; Andor Fürst, 14 Magnolienpark, Basel; Peter Keller, 10 Bahnhofstrasse, Therwil; Marcel Müller, 10 Quellenweg, Frenkendorf, all of Switzerland; Ulrich Kerb, 8 Waitzstrasse, and Rudolf Wiechert, 5 Petzower Strasse, both of Berlin, Germany

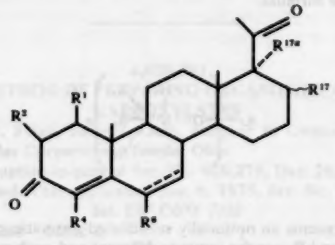
Filed Sept. 20, 1974, Ser. No. 507,884

Claims priority, application Switzerland, Sept. 26, 1973, 13762/73

Int. Cl.² C07J *63/00*

U.S. Cl. 260—488 B **18 Claims**

1. A D-homosteroid of the formula



wherein each of R^1 and R^2 is hydrogen or together are a carbon to carbon bond; R^4 is hydrogen or chloro; R^5 is

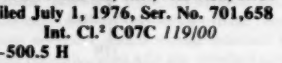
hydrogen, fluoro, chloro, bromo or methyl; R^{17} is hydrogen, methyl, methylene, C_{1-7}-alkanoyloxy or alkyloxy; R^{17a} is methyl or C_{1-7} alkanoyloxy provided that at least one of R^{17} or R^{17a} is C_{1-7} alkanoyloxy and wherein the broken line in the 6,7-position denotes an optional carbon to carbon bond, provided that when R_1 and R_2 are each hydrogen and R_6 is H or methyl, there is a double bond at the 6,7-position.

4,028,401
(SUBSTITUTED)UREIDOACETOHYDROXAMIC ACIDS

Dyral C. Fessler; George A. Heavner, both of Norwich, and Thomas H. Massey, Sherburne, all of N.Y., assignors to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed July 1, 1976, Ser. No. 701,658
Int. Cl.² C07C *119/00*
U.S. Cl. 260—500.5 H **9 Claims**

1. A compound of the formula:



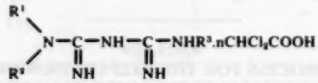
wherein R is isobutyl, hydrogen, methyl, benzyl, 4-aminobutyl or hexyl and R_1 is hydrogen or benzyl.

4,028,402
BIGUANIDE SALTS

Ulf Fischer, Frenkendorf, and Eckehard Lorch, Reinach, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Oct. 8, 1975, Ser. No. 620,525
Claims priority, application Switzerland, Oct. 11, 1974, 13697/74
Int. Cl.² C07C *129/16*
U.S. Cl. 260—501.14 **5 Claims**

1. A compound of the formula

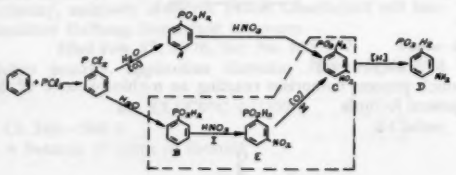


wherein R^1 is hydrogen, lower alkyl or lower alkenyl; R^2 is lower alkyl, aryl or aryl-lower alkyl; R^3 is hydrogen; and *n* is 1 or 2.

4,028,403
PROCESS FOR PREPARING M-AMINOBENZENEPHOSPHONIC ACID

William A. Sanderson, Palo Alto, Calif., assignor to Burlington Industries, Inc., Greensboro, N.C.

Filed June 7, 1976, Ser. No. 693,230
Int. Cl.² C07F *9/38*
U.S. Cl. 260—502.5 **1 Claim**



1. A process for preparing m-aminobenzenephosphonic acid comprising the steps of:

a. reacting benzenephosphonous acid in a sulfuric acid medium under nitrating conditions by the dropwise addition of nitric acid at a temperature of about 0° C. to about 5° C. to form m-nitrobenzenephosphonous acid in a reaction mixture;

b. warming the reaction mixture to about 20°-25° C. or a higher temperature sufficient to initiate oxidation of the m-nitrobenzenephosphonous acid, and thereafter continuing the oxidation reaction until m- nitrobenzenephosphonic acid is formed;

c. reducing the m-nitrobenzenephosphonic acid with hydrogen to form m-aminobenzenephosphonic acid; and

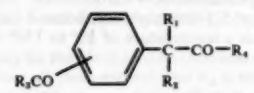
d. recovering the m-aminobenzenephosphonic acid from the reaction mixture.

4,028,404
ACETIC ACID DERIVATIVES

David Edmund Bays, and Roy Vivian Foster, both of London, England, assignors to Allen & Hanburys Limited, England

Continuation-in-part of Ser. No. 372,511, June 22, 1973, abandoned, which is a division of Ser. No. 747,435, July 27, 1968, Pat. No. 3,828,093. This application Apr. 26, 1974, Ser. No. 464,381
Claims priority, application United Kingdom, Feb. 22, 1974, 8218/74; July 31, 1967, 35166/67
Int. Cl.² C07C *63/33, 69/95*
U.S. Cl. 260—515 R **14 Claims**

1. A phenylacetic acid derivative of the general formula:



in which the group R_5CO— may only be meta or para oriented with respect to the side chain $—CR_1R_2—COR_4$ and in which R_1 and R_2, which may be the same or different, are each hydrogen or alkyl containing from 1 to 6 carbon atoms, R_5 is cycloalkyl containing from 3 to 9 carbon atoms, and R_4 is hydroxy or lower alkoxy containing from 1 to 6 carbon atoms, or a pharmaceutically acceptable salt of said derivative in which R_4 is hydroxy with an organic or inorganic base.

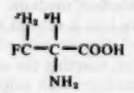
8. An anti-inflammatory and analgetic composition containing an anti-inflammatory effective amount or an analgetic effective amount of the compound of claim 1 and a pharmaceutically acceptable carrier or diluent therefor.

4,028,405
FLUORINATED AMINO ACIDS

Janos Kollonitsch, Westfield, and Frederick M. Kahan, Rahway, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 514,865, Oct. 15, 1974, abandoned, which is a continuation of Ser. No. 238,684, March 27, 1972, abandoned, which is a continuation of Ser. No. 149,814, June 3, 1971, abandoned. This application June 7, 1976, Ser. No. 693,819
Int. Cl.² C07C *101/10*
U.S. Cl. 260—534 C **3 Claims**

1. A compound of structural formula



wherein X is 1 or 2 and y is 2.

2. 2-Deutero-3-fluoro-D-alanine.

3. 2,3,3-Trideutero-3-fluoro-D-alanine.

4,028,406
PROCESS OF PREPARING PENICILLAMINE

Friedrich Asinger, Aachen; Heribert Offermanns, Grossauheim, and Karl-Heinz Gluzëk, Aachen, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Continuation of Ser. No. 481,858, June 21, 1974, abandoned, which is a continuation of Ser. No. 158,512, June 30, 1971, abandoned. This application Feb. 13, 1976, Ser. No. 657,835

Claims priority, application Germany, July 3, 1970, 2032952; May 11, 1971, 2123232

Int. Cl.² C07C *99/00*

U.S. Cl. 260—534 S **14 Claims**

1. In a process for the production of D,L-penicillamine by the reaction of isobutyraldehyde with sulfur and ammonia to form 2-isopropyl-5,5-dimethylthiazoline-3, conversion of the thiazoline with anhydrous hydrogen cyanide into 2-isopropyl-5,5-dimethylthiazolidine-4-carbonitrile, hydrolysis of the nitrile with hydrochloric acid to 2-isopropyl-5,5-dimethylthiazolidine-4-carboxylic acid hydrochloride and ammonium chloride, working up the mixture and separation of the ammonium chloride and hydrolytically breaking down the 2-isopropyl-5,5-dimethylthiazolidine-4-carboxylic acid to form penicillamine the improvement comprising carrying out the hydrolysis of the 2-isopropyl-5,5-dimethylthiazolidine-4-carbonitrile by (1) converting the 2-isopropyl-5,5-dimethylthiazolidine-4-carbonitrile with the hydrochloric acid into 2-isopropyl-5,5-dimethylthiazolidine-4-carbonamide hydrochloride at a temperature of 0° to 80° C and (2) converting the 2-isopropyl-5,5-dimethylthiazolidine-4-carbonamide hydrochloride into 2-isopropyl-5,5-dimethylthiazolidine-4-carboxylic acid hydrochloride at a temperature of 80° to 150° C.

4,028,407
METHOD OF PRODUCING TARTARIC ACID

Klaus Petritsch, Weissenstein (Drau), and Peter Korl, Feistritz, both of Austria, assignors to Firma/Osterreichische Chemische Werke Gesellschaft m.b.H, Mariahilfer Gurtel, Austria

Filed Dec. 18, 1975, Ser. No. 641,875

Claims priority, application Austria, Dec. 20, 1974, 10215/74

Int. Cl.² C07C *59/14*

U.S. Cl. 260—536 **12 Claims**

1. In a method of producing tartaric acid comprising the steps of epoxidising acid calcium maleate in a reaction medium with hydrogen peroxide in the presence of a tungstic acid-containing catalyst, reacting the resulting acid calcium epoxysuccinate with sulphuric acid to form calcium sulphate and epoxysuccinic acid, and effecting hydrolysis of said epoxysuccinic acid to tartaric acid in an equeous medium, the improvement comprising separating the acid calcium epoxysuccinate from the reaction medium, transferring said acid calcium epoxysuccinate into a solvent medium selected from the group consisting of organic solvents and mixtures of organic solvents and water, reacting the acid calcium epoxysuccinate in the solvent medium with sulphuric acid, separating calcium sulphate from the solvent medium, and recovering from said solvent medium liberated organic acids consisting essentially of epoxysuccinic acid in a substantially pure state and substantially free from calcium salt.

4,028,408
NOVEL PREPARATION OF TRIFLUOROMETHYLTHIOACETIC ACID

Sidney Harry Levinson, and Wilford Lee Mendelson, both of Philadelphia, Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

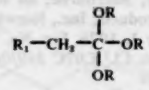
Filed Apr. 15, 1976, Ser. No. 677,190

Int. Cl.² C07C *149/16, 153/017, 148/00*

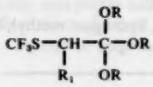
U.S. Cl. 260—539 R **12 Claims**

6. The method of preparing the trifluoromethylthio acetic or α-trifluoromethylthiopropionic acid comprising:

1. reacting a compound of the structure:



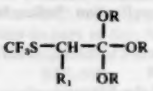
in which R_1 is hydrogen or methyl and R is methyl or ethyl with trifluoromethylsulfenyl chloride to give a trialkoxy compound of the structure:



in which R and R_1 are as defined above, then

2. reacting said trialkoxy compound at reflux temperature with a concentrated strong inorganic acid.

10. The compound of the structure:



in which R_1 is hydrogen or methyl and R is methyl or ethyl.

4,028,409
PROCESS FOR THE PREPARATION OF α-OXOTHIODIMETHYLAMIDE COMPOUNDS

Wolfgang Krämer; Wilfried Draber; Helmut Timmler, and Heinz Förster, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

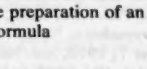
Filed Dec. 15, 1975, Ser. No. 640,829

Claims priority, application Germany, Dec. 21, 1974, 2460909

Int. Cl.² C07C *153/05, 153/057*

U.S. Cl. 260—551 S **12 Claims**

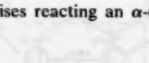
1. A process for the preparation of an α-oxothiodimethylamide of the general formula



in which

R^1 is alkyl or aryl,

which process comprises reacting an α-chloroketone of the general formula



in which

X is hydrogen or chlorine and

R^1 is identified as above,

with sulfur and dimethylamine in water at a temperature between 50° and 90° C.

4,028,410
PROCESS OF PREPARING 1,3-BIS(2-CHLOROETHYL)-1-NITROSOUREA

William H. Yanko, Centerville, and Donald E. Sharp, Dayton, both of Ohio, assignors to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.

Filed Nov. 13, 1974, Ser. No. 523,334
Int. Cl.² C07C *127/15*
U.S. Cl. 260—553 R 4 Claims

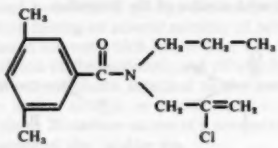
1. A method of producing 1,3-bis(2-chloroethyl)-1-nitrosourea which comprises reacting 1,3-bis(2-chloroethyl)-urea with an excess of dinitrogen trioxide in the cold at 0° C to −10° C in the presence of a solvent selected from at least one member of the group selected from methylene dichloride, nitromethane, ethylene dichloride, acetonitrile, and ethyl ether and free from solvents which would interact with the reactants dinitrogen trioxide, urea and the product compound nitrosourea.

4,028,411
INSECT REPELLENT DIMETHYLBENZAMIDES

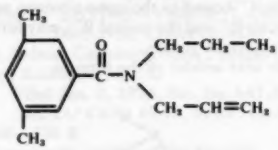
Don R. Baker, Orinda; Francis H. Walker, Mill Valley, and Peter E. Letchworth, Cupertino, all of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 417,306, Nov. 19, 1973, abandoned. This application Dec. 24, 1974, Ser. No. 536,276
The portion of the term of this patent subsequent to June 29, 1993, has been disclaimed.
Int. Cl.² C07C *103/76*
U.S. Cl. 260—558 R 2 Claims

1. A compound having the formula



2. A compound having the formula

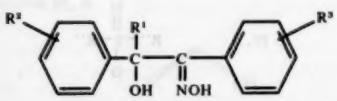


4,028,412
NOVEL CHELATE FORMERS

Jurgen Gehlhaus, and Dietrich Erdmann, both of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

Filed Feb. 17, 1976, Ser. No. 658,507
Claims priority, application Germany, Feb. 18, 1975, 2506727
Int. Cl.² C07C *131/00*
U.S. Cl. 260—566 A 8 Claims

1. A benzoin of oxime of formula



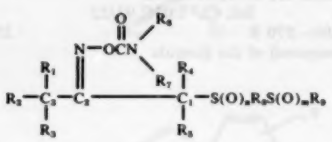
wherein R^1 is -A-S-R^4; R^2 and R^3 independently are H, methyl or chlorine; R^4 is alkyl of 1 to 8 carbon atoms and A is alkylene of 3 or 4 carbon atoms.

4,028,413
KETOXIME CARBAMATES

Thomas A. Magee, Mentor, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 229,207, Feb. 24, 1972, Pat. No. 3,875,232, which is a continuation-in-part of Ser. No. 32,584, April 8, 1971, abandoned. This application Feb. 27, 1975, Ser. No. 553,648
Int. Cl.² C07C *131/00*
U.S. Cl. 260—566 AC 3 Claims

1. A composition of matter having the formula:



where:

R_1=R_2-R_3 or hydrogen;

R_2-R_3=lower alkyl, lower alkenyl, lower alkynyl, with the proviso that R_2 and R_3 may be connected to form a cycloaliphatic ring;

R_4-R_5=hydrogen;

R_6-R_7=hydrogen, lower alkyl, lowr alkenyl, or lower alkynyl;

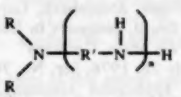
where m and n may be the same or different, and each is = 0, 1, or 2, R_8 is a lower alkylene radical; and R_9 is selected from the group consisting of hydrogen, lower alkyl, lower alkenyl, lower alkynyl, aryl, or haloalkyl.

4,028,414
PROCESS, PRODUCTS AND COMPOSITION

Thomas J. Clough, Glenwood, Ill., assignor to Atlantic Richfield Company, Philadelphia, Pa.

Continuation of Ser. No. 804,037, Jan. 2, 1969, abandoned, which is a division of Ser. No. 631,163, April 17, 1967, Pat. No. 3,479,291. This application Oct. 28, 1975, Ser. No. 625,977
Int. Cl.² C07C *119/00*
U.S. Cl. 260—566 R 15 Claims

1. A mineral oil-soluble condensation reaction product of (A) a mineral oil-soluble polymeric ketone having a molecular weight of from about 1,000 to 5,000 said polymeric ketone being prepared by the polymerization of a major portion of an α-monoalkene having from 3 to about 30 carbon atoms and mixtures thereof and a minor portion of another olefinically unsaturated copolymerizable monomer having from about 3 to about 25 carbon atoms said polymerization being initiated by the use of an acyl halide strong Friedel Crafts catalyst complex wherein the acyl portion of the acyl halide has from 2 to about 10 carbon atoms and is selected from the group consisting of the corresponding acid halides of saturated aliphatic acids and the corresponding acid halide of unsubstituted aromatic acids; and (B) a polyamine having the formula:



wherein R′ is a divalent alkylene radical of 2 to about 14 carbon atoms, R is selected from hydrogen and hydrocarbon radical of 1 to about 30 carbon atoms and n is 1 to about 10; the amounts of (A) and (B) in said product being sufficient to

provide up to about 1 mole of (B) and at least about 0.1 gram atom of primary amine nitrogen, per gram atom of ketonic oxygen in (A), said condensation reaction products being soluble in mineral lubricating oil and said reactions being conducted at a temperature and for a time sufficient to form said reaction products.

4,028,415

DIPHENYLPROPYLAMINES

Judith Ann Clark, Barrington, England, assignor to Beecham Group Limited, England

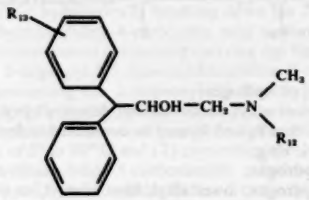
Filed Feb. 15, 1974, Ser. No. 443,021

Claims priority, application United Kingdom, Feb. 24, 1973, 9183/73; Oct. 13, 1973, 47928/73

Int. Cl.² C07C *91/22*

U.S. Cl. 260—570 R **29 Claims**

1. A compound of the formula



or a pharmaceutically acceptable acid addition salt thereof, wherein

R_{12} is hydrogen or methyl, and

R_{13} is fluorine, chlorine or bromine.

4,028,416

HINDERED PHENOL AMINES

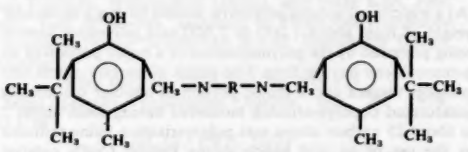
Michael Robin, Colonia, N.J., and Sheldon R. Schulte, Columbus, Ohio, assignors to Ashland Oil, Inc., Ashland, Ky.

Filed Feb. 14, 1972, Ser. No. 226,236

Int. Cl.² C07C *87/28*

U.S. Cl. 260—570.5 P **2 Claims**

1. A compound of the formula:



wherein R represents a C_2-C_{10} alkylene or alkylidene radical.

4,028,417

PROCESS FOR THE MANUFACTURE OF CYCLOHEXANDIONE-1,3

Werner Heinrich Müller, Aldersbach, Germany, and Tomas Weil, Sao Paulo, Brazil, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

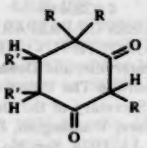
Filed July 28, 1976, Ser. No. 709,290

Claims priority, application Germany, July 30, 1975, 2533919

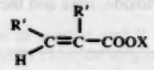
Int. Cl.² C07C *45/00*

U.S. Cl. 260—586 C **3 Claims**

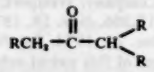
1. A process for the manufacture of a cyclohexandione-1,3 of the formula



in which each of the radicals R, which may be identical or different, represents hydrogen, an alkyl group or an aryl group and the radicals R′ represent hydrogen or an alkyl group, the cyclohexanedione-1,4 having up to 24 carbon atoms altogether, by reacting an α,β-unsaturated carboxylic acid ester of the formula

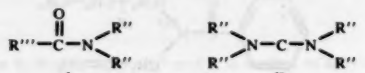


in which R′ has the aforesaid meaning and X stands for an alkyl group, with a ketone of the formula



in which R has the aforesaid meaning, in the liquid phase in the presence of a strong base and of a solvent, which comprises using a solvent belonging to one of the following classes of compounds:

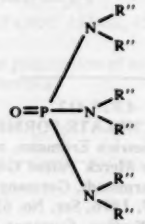
a. carboxylic acid amides of the formulae



I. II.

in which the radical R‴ represents hydrogen or an alkyl group and the radicals R″, which may be identical or different, represent an alkyl or an aryl group and two of the radicals R″ bound to the same nitrogen atom or one of the radicals R″ and the radical R‴ may form together a ring of methylene groups;

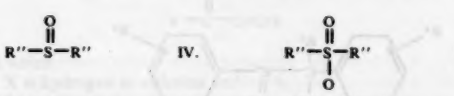
b. phosphoric acid amides of the formula



III.

in which the radicals R″ have the same meaning as in formulae I and II;

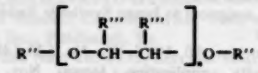
c. sulfoxides and sulfones of the formulae



IV. V.

in which the radicals R″ have the same meaning as in formulae I and II; and

d. ethers of the formula



in which *n* is in the range of from 1 to 5 and the radicals R''' and R'' have the same meaning as in formula I.

4,028,418

PROCESS FOR THE PREPARATION OF CYCLOBUTANONES

Marinus J. van den Brink; Helena Austermühle-Bertola, and Petrus A. Kramer, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

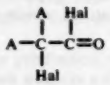
Filed Aug. 25, 1975, Ser. No. 607,534

Claims priority, application United Kingdom, May 21, 1975, 21814/75

Int. Cl.² C07C *45/02*, *51/00*

U.S. Cl. 260—586 C **17 Claims**

1. A process for the preparation of a cyclobutanone which process comprises contacting a 2-haloacyl halide of the formula



in which formula each A represents a halogen atom having an atomic number of not more than 35, a hydrogen atom or an unsubstituted hydrocarbyl group; and each Hal represents a halogen atom having an atomic number of not more than 35, in an alkanone solvent which has at least two branches in the carbon skeleton of the molecule and of which not more than one of the carbon atoms attached to the carbonyl group is quaternary with a straight or branched chain alkene having from 2 to about 20 carbon atoms at a temperature above 5° C in the presence of zinc and/or tin.

4,028,419

2-DECARBOXY-2-HYDROXYMETHYL-CIS-4,5-DIDEHYDRO-PGE$_1$ COMPOUNDS

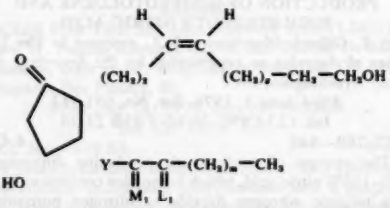
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Jan. 8, 1976, Ser. No. 647,363

Int. Cl.² C07C *49/46*, *49/80*, *49/82*

U.S. Cl. 260—586 R **22 Claims**

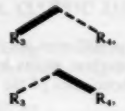
1. A prostaglandin analog of the formula



wherein Y is trans-CH=CH-;
wherein M_1 is

or

wherein R_3 is hydrogen or methyl;
wherein L_1 is



or a mixture of

and

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, the same or different, with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;
wherein g is one, 2, or 3; and
wherein m is one to 5, inclusive.

4,028,420

PROCESS FOR THE PREPARATION OF HEX-2-ENAL

Michel Jouffret, Rhone, France, assignor to Rhone-Poulenc Industries, Paris, France

Filed June 5, 1975, Ser. No. 584,118

Claims priority, application France, June 6, 1974, 74.19550

Int. Cl.² C07C *47/20*

U.S. Cl. 260—601 R **9 Claims**

1. In a process for preparing hex-2-enal by subjecting cyclohexyl hydroperoxide is the liquid phase to the action of an aqueous solution of an alkali metal or alkaline earth metal halogenopalladate which is soluble in water, at a temperature from 50° C. up to the boiling point of the mixture, the improvement wherein the aqueous phase also contains a divalent iron salt of an inorganic acid in an amount so as to provide 0.01 to 20 gram atoms of elementary iron per 100 mols of hydroperoxide, and a number of gram atoms of iron which is at most equal to the number of gram atoms of palladium.

4,028,421

PRODUCTION OF TERTIARY (HYDROXYMETHYL)-METHYLPHOSPHINE OXIDES

Bernd Lippsmeier, Hurth-Knapsack; Klaus Hestermann, Erftstadt Bliesheim, and Martin Reuter, Frankfurt am Main-Unterliederbach, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 21, 1975, Ser. No. 560,890

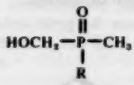
Claims priority, application Germany, Mar. 22, 1974, 2413824

The portion of the term of this patent subsequent to Apr. 26, 1994, has been disclaimed.

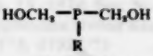
Int. Cl.² C07F *9/53*

U.S. Cl. 260—606.5 P **3 Claims**

1. In the process for making tertiary methylphosphine oxides of the formula



in which R is identical or different alkyls other than hydroxymethyl having 1 to 6 carbon atoms by rearranging tertiary bis-(hydroxymethyl)-phosphines of the formula



in which R has the meanings given above, in the presence of a catalyst and in the absence of oxygen, water and alcohol at minus 10° to plus 250° C, the improvement which comprises using BF_3 . etherate as catalyst.

4,028,422

OLEFINIC SULFONES

Marc Julia, Paris, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, France

Filed June 23, 1975, Ser. No. 589,555

Claims priority, application France, June 25, 1974, 74.22004

Int. Cl.² C07C *147/08*

U.S. Cl. 260—607 AR **9 Claims**

1. Olefinic sulfones of the general formula:

wherein one of X and Y is a hydrogen and the other a —SO_2—Ph radical wherein Ph is selected from the group consisting of an unsubstituted phenyl radical and a substituted phenyl radical having at least one substituted group selected from a halogen atom and an alkyl radical containing from 1 to 5 carbon atoms and wherein *n* is an integer from 1 to 3.

4,028,423

OXIDATION OF ALIPHATIC AND ALICYCLIC HYDROCARBONS

Arthur M. Brownstein, Cherry Hill, N.J., and David L. Kerr, Wilmington, Del., assignors to Sun Oil Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 722,178, April 18, 1968, abandoned. This application Nov. 25, 1970, Ser. No. 92,834

Int. Cl.² C07C *179/02, 179/06*

U.S. Cl. 260—610 B **6 Claims**

1. A process for the oxidation of hydrocarbons which comprise contacting an unsubstituted C_3-C_{16} saturated or monounsaturated hydrocarbon selected from the group consisting of alkanes, alkenes, cycloalkenes and polycycloalkanes with oxygen or air at temperatures of from 25° to 200° C in the presence of a catalyst comprising a copper polyphthalocyanine and an aromatic heterocyclic amine, said amine being selected from the group consisting of pyridine, quinoline, isoquinoline, triazine, and pyrazine, wherein the weight ratio of amine to copper polyphthalocyanine is between 0.7:1 and 2:1.

4,028,424

PROCESS FOR PREPARING UNSATURATED ALCOHOLS

Yoshinori Yoshida, and Yoshiro Yamamoto, both of Yokohama, Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

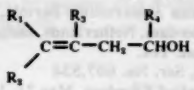
Filed Nov. 10, 1975, Ser. No. 630,148

Claims priority, application Japan, Nov. 15, 1974, 49-131114; Mar. 19, 1975, 50-32283

Int. Cl.² C07C *29/00*

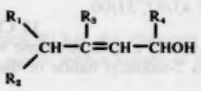
U.S. Cl. 260—638 R **11 Claims**

1. A process for preparing unsaturated alcohols of the formula



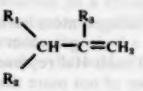
(III)

or



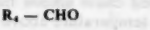
(IV)

wherein R_1, R_2 and R_3 are independently hydrogen or alkyl having 1 to 8 carbon atoms which comprises reacting an α-olefin of the formula,



(I)

wherein R_1, R_2 and R_3 are independently hydrogen or alkyl having 1 to 8 carbon atoms, with an aldehyde of the formula,



(II)

wherein R_4 is hydrogen or alkyl having 1 to 8 carbon atoms, the molar ratio of (I)/(II) being 1 to 10, at a temperature of from 150° to 250° C in the presence of 0.005 – 10 mole%, based on the aldehyde charged, of a phosphate of a metal in the IA and IIA groups of the periodic table or of zinc, aluminum, iron, cobalt, nickel or of ammonium.

4,028,425

CONTINUOUS PROCESS FOR CONCURRENT PRODUCTION OF DINITROTOLUENE AND HIGH-STRENGTH NITRIC ACID

Everett E. Gilbert, Morristown, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 1, 1976, Ser. No. 691,912

Int. Cl.² C07C *79/10;* C01B *21/38*

U.S. Cl. 260—645 **6 Claims**

1. The process of continuously producing dinitrotoluene and 93–103% nitric acid, which comprises continuously introducing toluene, nitrogen dioxide or nitrogen peroxide and oxygen into a reaction zone containing a reaction medium consisting essentially of dinitrotoluene and 93–103% nitric acid, maintaining the resulting mixture of toluene, nitrogen dioxide or nitrogen peroxide, oxygen and reaction medium under a pressure of at least 100 psig. until a reaction product consisting essentially of dinitrotoluene and 93–103% nitric acid in a mol ratio of about 2 mols of nitric acid and 1 mol of dinitrotoluene is produced, and continuously removing said reaction product from the reaction zone.

4,028,426

REMOVAL OF MONOCHLOROACETYLENE FROM CHLORINATED HYDROCARBONS

John Douglas Mansell, Corpus Christi, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 18, 1975, Ser. No. 632,922
Int. Cl.² C07C 17/38
U.S. Cl. 260—652 P 8 Claims

1. A method of reducing the monochloroacetylene content of liquid saturated or ethylenically unsaturated chlorohydrocarbons which comprises contacting said chlorohydrocarbons with a liquid catalyst composition comprising cuprous halide and aqueous haloid acid selected from HCl, HBr, HI at a temperature and pressure which mmaintains the catalyst in liquid form.

4,028,427

AQUEOUS STREAM TREATMENT IN CHLORINATED HYDROCARBON PRODUCTION

Utah Tsao, Jersey City, N.J., assignor to The Lummus Company, Bloomfield, N.J.

Filed Aug. 27, 1975, Ser. No. 608,193
Int. Cl.² C07C 19/00, 21/04, 25/04
U.S. Cl. 260—659 R 10 Claims

1. In a process for the production of chlorinated hydrocarbons from a hydrocarbon wherein a chlorinated hydrocarbon effluent including water vapor is withdrawn from a chlorinated hydrocarbon production zone, the improvement comprising:

recovering waste water from the chlorinated hydrocarbon effluent, said waste water including chlorinated hydrocarbons as impurities;

stripping chlorinated hydrocarbons from the waste water, said stripping being effected with a stripping gas comprising a portion of the feed to the chlorinated hydrocarbon production zone selected from the group consisting of hydrocarbon and oxygen containing gas;

recovering stripped waste water;

recovering stripping gas and stripped chlorinated hydrocarbon impurities; and

introducing said recovered stripping gas and chlorinated hydrocarbon impurities into the chlorinated hydrocarbon production zone.

4,028,428

PROCESS FOR THE SEPARATION OF ETHYLBENZENE

Richard W. Neuzil, Downers Grove, and Donald H. Rosback, Elmhurst, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed July 14, 1975, Ser. No. 595,838
Int. Cl.² C07C 7/00
U.S. Cl. 260—674 SA 8 Claims

1. A process for separating ethylbenzene and xylenes from a feed mixture comprising ethylbenzene and a plurality of xylene isomers including para-xylene which comprises contacting said mixture at adsorption conditions with an adsorbent comprising type X or type Y zeolite essentially completely exchanged with strontium, selectively adsorbing said xylene isomers to the substantial exclusion of ethylbenzene, recovering the unadsorbed ethylbenzene, contacting the adsorbent with a desorbent material comprising toluene at desorption conditions to remove adsorbed xylene isomers therefrom, and withdrawing from the adsorbent an extract stream containing said xylene isomers.

4,028,429

PREPARATION OF HIGH TRANS-ISOMER CONTENT 1,4-DIENES

Richard David Cramer, Landenberg, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 9, 1976, Ser. No. 647,994
Int. Cl.² C07C 25/00
U.S. Cl. 260—680 R 10 Claims

1. Method of preparing 1,4-dienes of high trans-isomer content which comprises contacting ethylene with 1,3-diene of the formula

$CH_2=C(R^1)CH=CHR^2$ or

$CH_2=CHC(R^1)=CHR^2$

where

R^1 is hydrogen, methyl, ethyl or chlorine, and

R^2 is hydrogen, C_1–C_{15} alkyl, C_6–C_{12} aryl, or C_7–C_{18} alkaryl,

in the presence of a soluble catalyst system which comprises

a. 0.00001–0.01 mole per liter of organic solvent-soluble organonickel compound in which the nickel is zerovalent or divalent,

b. hydrocarbylaluminum halide selected from the group consisting of hydrocarbylaluminum chlorides and hydrocarbylaluminum bromides in an amount at least equimolar with the organonickel compound, and

c. aminophosphine of the formula

$$(R^3)_m(R^4)_nP(R^5)_p$$

where

R^3 is C_6–C_{12} aryl, or substituted C_6–C_{12} aryl containing up to two substituents selected from the group consisting of C_1–C_6 alkyl, chlorine, bromine, iodine and fluorine,

R^4 is C_1–C_6 alkyl, C_1–C_6 alkoxy, C_6–C_{12} aryloxy, or substituted C_6–C_{12} aryloxy containing up to two substituents selected from the group consisting of C_1–C_6 alkyl, chlorine, bromine, iodine and fluorine, and

R^5 is 1-pyrryl, di(C_1–C_6 alkyl)amino, (C_1–C_6 alkyl)(C_6–C_{12} aryl)amino, or substituted (C_1–C_6 alkyl)(C_6–C_{12} aryl-)amino in which the aryl group contains up to two substituents selected from the group consisting of C_1–C_6 alkyl, chlorine, bromine, iodine and fluorine,

m and n independently are integers from 0 to 2,

p is an integer from 1 to 3, and

$m + n + p = 3$,

provided, when R^5 is di(C_1–C_6 alkyl)amino,

m is 2, and

n is 0,

and, when R^5 is (C_1–C_6 alkyl)(C_6–C_{12} aryl)amino or substituted (C_1–C_6 alkyl)(C_6–C_{12} aryl) amino,

m is 1 or 2, and

n is 0.

4,028,430

SIMULATED MOVING BED REACTION PROCESS

Laurence O. Stine, Western Springs, and Dennis J. Ward, South Barrington, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed June 16, 1975, Ser. No. 587,468
Int. Cl.² C07C 3/50
U.S. Cl. 260—683.43 10 Claims

1. A continuous fixed bed catalytic alkylation reaction and catalyst reactivation process comprising the steps of:

a. providing a fixed bed of solid catalyst containing four zones having a fluid flow connecting path between said zones to interconnect said zones;

b. arranging said zones in a series and providing fluid flow connecting means between the last zone and the first zone of the series to provide a directional circular flow path through said zones;

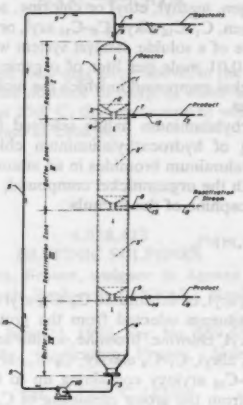
c. providing a point between each two successive zones for introducing an inlet stream or withdrawing a product stream;

d. introducing a reactivation stream including alkylatable

hydrocarbon at a first point located between two successive zones (zone II and zone III) to effect catalyst reactivation and to provide alkylatable hydrocarbon as a continuous component throughout said fixed bed of solid catalyst;

e. simultaneously withdrawing a first product stream from a second point located between said zone III and the next successive zone in the direction of flow (zone IV);

f. simultaneously introducing reactants consisting essentially of isobutane, isopentane or a mixture thereof and at least one $C_3 - C_5$ olefin into said fixed bed of catalyst at a third point located between said zone IV and the next successive zone in the direction of flow (zone I) and



reacting said reactants at a temperature of about 100° F to 400° F to effect an alkylation reaction, a result of which is deactivation of said catalyst, said alkylation and catalyst reactivation being the principal reactions of the process;

g. simultaneously withdrawing a second product stream from a fourth point located between said zone I and the next successive zone in the direction of flow (zone II); and,

h. periodically advancing downstream the points of charging said reactants and said reactivation stream, and the points of withdrawal of said product streams to the next successive points for introducing an inlet stream or withdrawing an outlet stream.

4,028,431

CURED RUBBER COMPOSITION

Takashi Futami, Hirakata; Yoshiharu Tatsukami, Niihama; Toyoji Takamoto, Takatsuki; Yasuhiro Oda, Takatsuki, and Masayasu Tomoda, Takatsuki, all of Japan, assignors to Daikin Kogyo Co., Ltd. and Sumitomo Chemical Company, Limited, both of Osaka, Japan

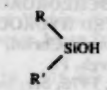
Filed May 12, 1975, Ser. No. 576,366

Claims priority, application Japan, May 15, 1974, 49-54889; May 15, 1974, 49-54890

Int. Cl.² C08L *23/00, 23/28, 83/00*

U.S. Cl. 260—827 **17 Claims**

1. A cured rubber composition prepared by curing with an organic peroxide as a curing agent, a composition consisting essentially of 99 to 5 parts by weight of (A) a fluorine-containing ethylene copolymer of ethylene, hexafluoropropene and if desired other ethylenically unsaturated monomers containing 10 to 50 mole % of hexafluoropropene and 0 to 50 mole % of the other ethylenically unsaturated monomers and 1 to 95 parts by weight of (B) a silicone rubber prepared by polycondensation of a silanol compound represented by the general formula



(wherein R and R′ are saturated aliphatic groups, unsaturated aliphatic groups, aromatic groups, or derivatives of these groups) alone or polycondensation of a combination of two or more of said silanol compound and/or (C) a fluorine-containing copolymer of vinylidene fluoride and at least one other fluorine-containing olefinic monomer.

4,028,432

PROCESS FOR MANUFACTURING FLEXIBLE EPOXIDE RESINS

Francois Dawans, Bougival, and Jean-Pierre Durand, Chatou, both of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Mar. 27, 1975, Ser. No. 562,846

Claims priority, application France, Mar. 29, 1974, 74.11256

Int. Cl.² C08L *63/10*

U.S. Cl. 260—836 **10 Claims**

1. In a process for manufacturing a solid epoxy resin composition by reacting under heating a liquid epoxy resin having more than one 1,2-epoxy group per molecule, with a polycarboxy hardener having carboxylic functions selected from the group consisting of a carboxylic acid function and a carboxylic acid anhydride function, the proportion of said liquid epoxy resin to said polycarboxy hardener being of from 0.5 to 1.5 epoxy group per carboxy equivalent,

the improvement wherein said polycarboxy hardener consists essentially of a proportion of 98 to 85% with respect to the total carboxy equivalents of methylnadic anhydride and a proportion of 2 to 15% with respect to the total carboxy equivalents, of at least one polybutadiene containing carboxylic functions statistically distributed along the chain resulting from the addition of a proportion of 3–25 carboxy equivalents per each 100 butadiene units, of a carboxylic compound selected from the group consisting of maleic anhydride, thioglycolic acid and acetic acid, to a polybutadiene having a number average molecular weight of from 500 to 15,000 and containing more than 80% of cis - 1,4 units.

4,028,433

THERMOPLASTIC MOULDING COMPOUNDS

Richard Prinz, Leverkusen; Salah Elabd Elghani, Duesseldorf; Winfried Fischer, and Heinrich Alberts, both of Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed June 30, 1975, Ser. No. 591,501

Claims priority, application Germany, July 4, 1974, 243212

The portion of the term of this patent subsequent to Nov. 2, 1993, has been disclaimed.

Int. Cl.² C08L *67/06*

U.S. Cl. 260—873 **3 Claims**

1. A thermoplastic moulding composition comprising

1. from 5 to 95% by weight, based on component (1) and (2), of a polycarbonate of a divalent phenol,

2. from 95 to 5% by weight, based on component (1) and (2), of a graft copolymer comprising

a. at least one monovinyl aromatic compound,

b. acrylonitrile, an acrylonitrile derivative or a mixture thereof and optionally

c. an α-olefin on an ethylene/vinyl acetate copolymer as a graft substrate, and

3. from 10 to 50% by weight, based on the total moulding composition of a brittle thermoplastic resin which is a copolymer of

i. acrylonitrile, methacrylonitrile or any mixture thereof and

ii. styrene, a styrene derivative or any mixture thereof.

4,028,434

GRAFT POLYMERS OF VINYL PHOSPHONIC ACID ESTERS

Wolfgang Konter; Josef Witte, both of Cologne; Peter Vehlewald, Leichlingen, and Hans-Dieter Block, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 14, 1975, Ser. No. 604,680

Claims priority, application Germany, Sept. 3, 1974, 2442101

Int. Cl.² C08L *43/00*

U.S. Cl. 260—874 6 Claims

1. A graft polymer of

a. from 5 to 50 parts by weight of halogen-free vinyl phosphonic acid alkyl ester

b. from 0 to 30 parts by weight of nitrogen-containing polymerizable vinyl compound and

c. a polyalkylene oxide free from unsaturation having a molecular weight of from 1500 to 10,000 the amounts of components (a) and (b) being based on 100 parts by weight of component (c).

4,028,435

PROCESS FOR PRODUCING BLOCK COPOLYMERS

Kenji Seki; Akio Kimura; Satoshi Asahi, all of Sodegaura, and Yasuhiro Takeshita, Ichihara, all of Japan, assignors to Idemitsu Kosan Co., Ltd., Tokyo, Japan

Filed Sept. 20, 1976, Ser. No. 724,969

Claims priority, application Japan, Sept. 23, 1975, 50-114340; Sept. 26, 1975, 50-115521

Int. Cl.² C08F *295/00, 297/08*

U.S. Cl. 260—878 B 16 Claims

1. A process for producing a block copolymer of (i) a polymer of ethylene or propylene, or a copolymer of ethylene or propylene with another α-olefin, and (ii) a polymer of an acrylic ester or a methacrylic ester, which comprises

polymerizing ethylene or propylene, or copolymerizing them, with another α-olefin having from 2 to 7 carbon atoms in the presence of catalytic amounts of titanium halide and an organic aluminum compound of the formula AlR_nX_{3-n} wherein R is an alkyl group having from 1 to 5 carbon atoms, X is a halogen and *n* is a integer of from 1 to 3,

adding in order (a), (b) and (c) to a polymeric product so obtained and copolymerizing therewith (a) an acrylic ester or a methacrylic ester, in the presence of (b) an organic phosphorus compound or a tertiary amine, and (c) a benzyl halide, a ring-alkylated benzyl halide, a benzyl halide in which a methylene hydrogen is replaced with an alkyl or aryl group, or an alkyl halide.

4,028,436

MELT PHASE PROCESS FOR THE PREPARATION OF EMULSIFIABLE POLYETHYLENE WAXES

Richard T. Bogan, and Claude M. Shelton, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 1, 1975, Ser. No. 563,992

Int. Cl.² C08L *23/26;* C08F *255/02, 222/06, 222/00*

U.S. Cl. 260—878 R 12 Claims

1. A process for the preparation of an emulsifiable modified polyethylene composition which comprises reacting in the melt phase process at a temperature of from 200° to 250° C. in the presence of a free radical source and in the presence of less than 5 ppm of oxygen (1) low viscosity polyethylene waxes having a melt viscosity of from about 200 to 600 cp. as measured at 125° C. with (2) at least one unsaturated polycarboxylic component selected from the group consisting of maleic acid, maleic anhydride, fumaric acid, citraconic anhydride and half esters derived from maleic and fumaric acids.

4,028,437

DODECAHALO-9,10-OXADECAHYDRO-1,4:5,8-DIMETHANOANTHRACENE FLAME RETARDANTS FOR POLYMERS

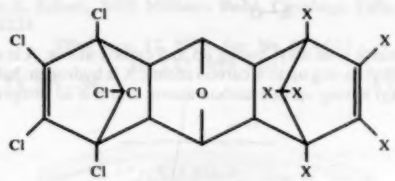
Yong S. Rim, Waterbury, and Walter Nudenberg, Newtown, both of Conn., assignors to Uniroyal Inc., New York, N.Y.

Division of Ser. No. 492,643, July 29, 1974, Pat. No. 3,976,664. This application Jan. 28, 1976, Ser. No. 653,164

Int. Cl.² C08K *5/59, 5/15*

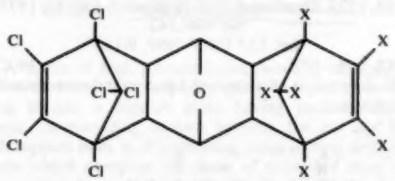
U.S. Cl. 260—880 R 21 Claims

1. A flame retardant composition comprising an organic polymer selected from the group consisting of hydrocarbon polymers, nitrile-containing polymers, and polyurethane polymers; and an effective flame retardant amount of a compound having the formula



in which all of the X substituents are either chlorine or bromine.

11. A flame retardant composition comprising a graft copolymer of acrylonitrile, butadiene and styrene, an effective flame retardant amount of a compound having the formula



in which all of the X substituents are either chlorine or bromine and a compound of antimony.

4,028,438

PHOSPHOROTHIOLATES

Hiroshi Tsuchiya, Ashiya; Kunio Mukai, Nishinomiya; Akio Kimura, Takarazuka; Hiroshi Taya, Minoo; Keimei Fujimoto, Kyoto; Toshiaki Ozaki; Sigeo Yamamoto, both of Toyonaka; Taizo Ogawa; Tadashi Ooishi, both of Minoo, and Yositosi Okuno, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

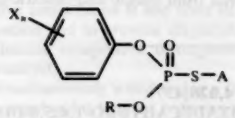
Continuation of Ser. No. 8,434, Feb. 3, 1970, abandoned, which is a continuation-in-part of Ser. No. 728,353, May 10, 1968, abandoned. This application Nov. 14, 1973, Ser. No. 415,682

Claims priority, application Japan, May 17, 1967, 42-31645; Sept. 8, 1967, 42-57677; Sept. 11, 1967, 42-58536; Sept. 12, 1967, 42-58859

Int. Cl.² C07F *9/165;* A01N *9/36*

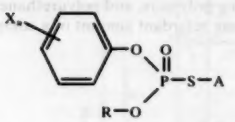
U.S. Cl. 260—948 17 Claims

1. A phosphorothiolate of the formula,



wherein R is an alkyl having up to 5 carbon atoms; A is an alkyl having 3 or 4 carbon atoms, haloalkyl having up to 3 carbon atoms, alkenyl having up to 4 carbon atoms, alkinyl having up to 4 carbon atoms, phenylthioalkyl having up to 9 carbon atoms or phenylsubstituted ethyl; X is hydrogen, halogen or alkyl having up to 5 carbon atoms; and *n* is an integer of 1 to 5.

17. A phosphorothiolate of the formula



wherein R is an alkyl having up to 5 carbon atoms; A is alkylthioalkyl having up to 6 carbon atoms; X is hydrogen, halogen or alkyl having up to 5 carbon atoms; and *n* is an integer of 1 to 5.

4,028,439

PROCESS FOR PREPARING PHOSPHOROTHIOATES AND PHENYLPHOSPHONOTHIOATES

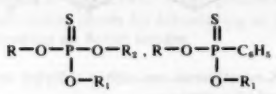
Lorraine M. Kroposki, Walnut Creek, Calif.; Masao Yoshimine, Midland, Mich., and Harold H. Freedman, Newton Center, Mass., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 354,040, April 24, 1973, Pat. No. 3,917,621, which is a continuation-in-part of Ser. No. 229,171, Feb. 24, 1972, abandoned. This application July 31, 1975, Ser. No. 600,542

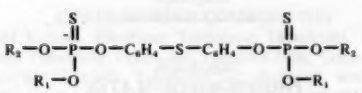
Int. Cl.[2] C07F *9/09, 9/165*

U.S. Cl. 260—973 **19 Claims**

1. In the process of preparing a compound corresponding to the formula



or



wherein:

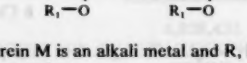
R_1 and R_2 are each independently lower alkyl; and *R* is

wherein:

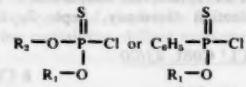
n is 0, 1, 2 or 3; and

X is nitro, cyano, halo, lower alkyl, lower alkoxy, lower alkylthio or lower alkylsulfinyl, with the proviso that R does not bear more than one nitro group, lower alkylthio group or lower alkylsulfinyl group; by reacting in an inert liquid reaction medium under neutral or alkaline conditions (a) a compound corresponding to the formula

or

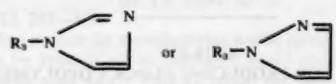


with (b) a compound corresponding to the formula



wherein M is an alkali metal and R, R_1 and R_2 have the aforesaid meaning;

the improvement consisting of conducting the process in the presence of a small but catalytic amount of (1) a quaternary ammonium salt having a minimum solubility of at least 1 weight percent in the liquid reaction medium at 25° C. and (2) a diazole corresponding to the formula



wherein R_3 is hydrogen or alkyl of 1 to 6 carbon atoms.

4,028,440

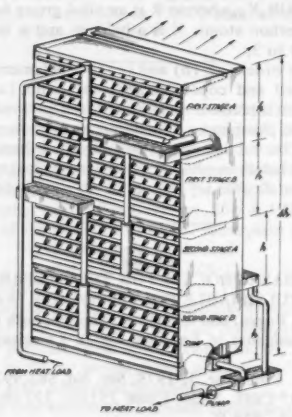
METHOD AND APPARATUS OF MULTI STAGE INJECTOR COOLING

John Engalitcheff, Jr., Gibson Island, Md., assignor to Baltimore Aircoil Company, Inc., Jessup, Md.

Continuation-in-part of Ser. No. 449,781, March 11, 1974, Pat. No. 3,929,435, which is a continuation of Ser. No. 183,015, Sept. 23, 1971, abandoned. This application May 29, 1975, Ser. No. 582,068

Int. Cl.[2] F28C *1/00*

U.S. Cl. 261—23 R **2 Claims**



2. A multiple stage injector type liquid cooling system comprising four injector type liquid cooling units stacked one above the other, the first being on the lowest level and the fourth on the highest level, said units four and three each containing a confined region having an end open to a source of first gas at a wet bulb temperature lower than that of the spray liquid, liquid spray means positioned to direct liquid

sprays into said confined regions to induce a flow of first gas from said source therethrough for mixing and partial evaporation of said liquid, separator means positioned in said confined regions downstream of said liquid spray means for separating said liquid from said first gas exiting from said confined regions, liquid collection means positioned below said separator means to collect the separated liquid at a first temperature above the wet bulb temperature of the separated first gas, gravity means for passing the liquid from the liquid collection means of the fourth and third liquid cooling units to a liquid spray means of the second and first cooling units respectively, said second and first cooling units containing a confined region having an open end to a source of second gas at a wet bulb temperature no higher than that of the first gas at said first mentioned source, said liquid spray means of said confined region in said second and first cooling units being positioned to cause said sprays to induce flow of said second gas from said source into said confined region for mixing and partial evaporation of said liquid, separator means in said confined region of said second and first units positioned in said confined region downstream of said liquid spray means for separating said second gas and liquid and liquid collection means positioned below said separator means in said confined region of said second and first units for collecting the liquid at a second temperature above the wet bulb temperature of the separated second gas but below the wet bulb temperature of the separated first gas, the combined total cross sectional area at the open ends of all said confined regions being less than the cross sectional area at the open end of a single similar confined region capable of cooling said liquid to second temperature.

4,028,441

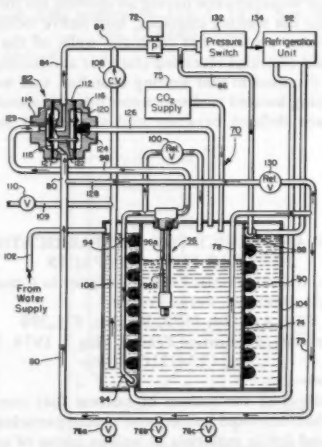
LIQUID LEVEL CONTROL SYSTEM AND CARBONATOR

George B. Richards, Lake Forest, Ill., assignor to Fluid Device Corporation, Highland Park, Ill.

Continuation of Ser. No. 345,907, March 29, 1973, abandoned, which is a division of Ser. No. 840,119, June 19, 1969, Pat. No. 3,730,500, which is a continuation-in-part of Ser. No. 724,385, April 26, 1968, abandoned. This application Sept. 5, 1975, Ser. No. 610,846

Int. Cl.² B01F *3/04*

U.S. Cl. 261—36 R **5 Claims**



1. In a beverage dispensing system of the type including a liquid supply source, a liquid chilling tank, beverage dispensing means and recirculation means defining a closed loop flow path including a liquid pump, said chilling tank and said dispensing means for continuously circulating a chilled liquid to said dispensing means and further including liquid level sensing means and valve means for introducing liquid from said supply source into said chilling tank when the liquid level therein recedes below a predetermined level, the improvement comprising:

conduit means included in said recirculation flow path and extending from said chill tank for a predetermined long distance to said dispensing means and returning to the inlet side of said valve means;

and bypass means including a flow conduit of a substantially shorter length than said conduit means coupled between a portion of said conduit means adjacent said chill tank and the inlet side of said valve means for providing an adequate supply of liquid to said liquid pump to preclude pump cavitation and for providing an ancillary flow path to said dispensing means by flow through said flow conduit and said conduit means.

4,028,442

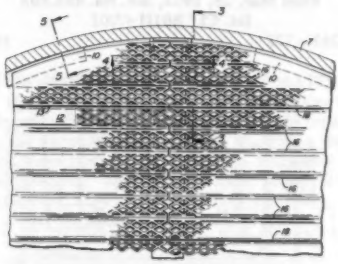
TOWER SUPPORT PLATE

John S. Eckert, 3000 Millboro Road, Cuyahoga Falls, Ohio 44224

Filed Sept. 12, 1975, Ser. No. 613,015

Int. Cl.² B01F *3/04*

U.S. Cl. 261—94 **6 Claims**



1. A tower of high gas-and-liquid handling capacity, provided with means for supplying gas and liquid thereto and having therein a support plate having packing elements thereon, for providing contact between the gas and liquid, which support plate is of undulating cross section and formed of units which comprise (a) areas of expanded sheet metal with openings formed of cross members and (b) areas which are not expanded, the size of said openings being suitable for supporting the packing elements, the support plate being broken in opposite directions along parallel lines with the bottoms formed of spaced unexpanded areas broken in the same plane to provide a bottom adapted to rest on a flat surface.

4,028,443

DISTILLATION APPARATUS

Richard Donnan Livingston, and Robert Dewey Sauerbrunn, both of Seaford, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 24, 1976, Ser. No. 726,290

Int. Cl.² B01D *3/14*; B01F *3/04*

U.S. Cl. 261—114 TC **3 Claims**

1. In a distillation column having a cylindrical wall and containing more than two distillation plates, each plate being comprised of a circular tray peripherally supported by a ring attached to said inner cylindrical wall of the column, and the support ring having an opening, the improvement comprising

said tray periphery and said opening both having the shape of a circle interrupted by two parallel chords, the tray width

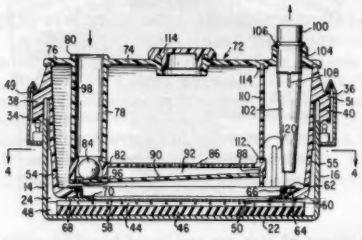
between the tray chords being smaller than the circular diameter of the support ring opening.

4,028,444

HUMIDIFIER AND AUTOMATIC CONTROL SYSTEM THEREFOR

Allen C. Brown, Acton; Neil R. Hattes, Danvers, and Theodore B. Eyrick, Andover, all of Mass., assignors to Chemetron Corporation, Chicago, Ill.

Filed Mar. 25, 1974, Ser. No. 454,503
Int. Cl.² B01D *47/02*
U.S. Cl. 261—122 **16 Claims**



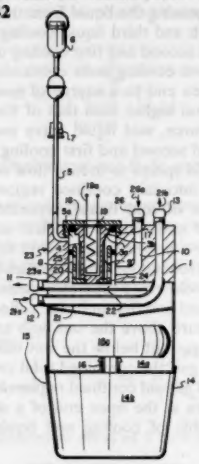
1. A system for humidifying breathing gases, comprising:
a support housing defining a recess;
a heater means in said recess and carried by said support housing;
container means for holding a supply of water, said container means including gas inlet and gas outlet means;
means removably securing said container means in said recess in heat transfer relationship with said heater means;
diffuser means within said container and spaced therefrom to define a diffuser chamber, said chamber being so located as to be below the surface of the supply of water during operation of said system and so located as to permit a free flow of water therearound, said diffuser means including a diffuser element for passing breathing gas upwardly out of said diffuser chamber;
means including said gas inlet means communicating with said diffuser chamber for directing said breathing gas into said diffuser chamber below the surface of the supply of water, said breathing gas thereafter passing upwardly through said diffuser element and the supply of water;
means including said gas outlet means communicating with the interior of said container to direct said breathing gas out of said container; and
a contaminant trap connected to said gas outlet means and located within said container for receiving and retaining backflowing contaminated liquid which returns from said outlet means to said container.

4,028,445

APPARATUS FOR WETTING RESPIRATORY GAS

Karl Hickmann, and Dieter Sahmkow, both of Lubeck, Germany, assignors to Dragerwerk Aktiengesellschaft, Germany

Filed Apr. 14, 1976, Ser. No. 676,648
Claims priority, application Germany, Apr. 15, 1976, 2516496
Int. Cl.² A61M *15/00*
U.S. Cl. 261—142 **4 Claims**



1. An apparatus for wetting respiratory gas, comprising a receiver having an interior wetting chamber and a cartridge receiving chamber with one end of said cartridge receiving chamber communicating with the wetting chamber and having an opposite end defining a cartridge receiving chamber opening, a water supply duct connected into the cartridge receiving chamber, a respiratory gas connected into the cartridge receiving chamber, and a heater cartridge in said cartridge receiving chamber comprising an inner portion, heater means in said inner portion for boiling water to evaporate it, a sleeve surrounding said inner portion and defining an annular water heating space therebetween having an opening for the passage of water into the wetting chamber, said sleeve being spaced from said inner portion and from the walls of the housing bounding said cartridge receiving chamber and having a lower closed end disposed in said wetting chamber, said water supply ducts being located to direct water into the annular water heating space defined between said sleeve and said inner portion.

4,028,446

METHOD AND DEVICE FOR THE FABRICATION OF NUCLEAR FUEL COMPACTS

Roko Bujas, Gif-sur-Yvette, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Apr. 24, 1975, Ser. No. 571,390
Claims priority, application France, May 3, 1974, 74.15480
Int. Cl.² G21C *21/00*
U.S. Cl. 264—.5 **8 Claims**

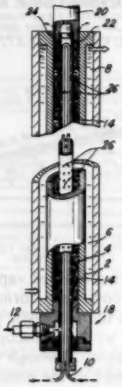
1. A method of fabrication of nuclear fuel compacts in which a cylindrical mold is filled with coated particles containing fissile and fertile materials as well as grains of graphite if necessary and said mold is heated to a temperature which is higher than the softening temperature of pitch, wherein said pitch is injected into said hot mold through openings located at regular intervals over the entire length of a cylindrical wall of the mold, the injection of pitch being performed at right angles to the generator-lines of the cylinder constituted by the mold and through said openings whose diameter is smaller than the size of the coated particles.

4. A device for the fabrication of nuclear fuel compacts, wherein said device comprises:

a mold of approximately annular shape filled with coated particles and if necessary with grains of graphite,

means for controlling the temperature of said mold,

a hollow cylindrical central duct forming the internal wall of said mold and containing pitch under pressure, said duct



being pierced by radial openings through which the pitch is injected into the mold,

two pistons performing the function of plugs, said pistons being located at the upper and lower ends of said mold, one of them supporting said central duct, and

means, including a channel through said piston supporting said duct, for injecting the pitch under pressure into the central duct.

4,028,447

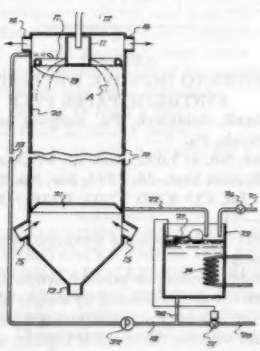
METHOD OF PRILLING MATERIAL

Norwood K. Talbert, Manlius, N.Y., assignor to Agway, Inc., DeWitt, N.Y.

Continuation-in-part of Ser. No. 354,592, April 26, 1973, abandoned. This application Apr. 1, 1976, Ser. No. 672,653

Int. Cl.² B01J 2/04

U.S. Cl. 264—8 4 Claims



1. The method of prilling molten material in a prilling chamber having upper and lower ends and vertical side walls, comprising:

a. discharging molten material at said upper end of the prilling chamber in droplet form,

b. cooling said droplets by the falling movement thereof downwardly through said chamber out of contact with the side walls of the chamber to cool the droplets below their melting point to form solid prills before they reach the lower end of the prilling chamber,

c. directing a spray of aqueous liquid against the interior of said side walls of said prilling chamber to provide a falling film of aqueous liquid along said side walls substantially about the prilling chamber to entrain fine unprilled particles of the material being prilled and to prevent such particles from adhering to the chamber side walls and to promote cooling of the interior of the chamber, and

d. collecting the downward flow of said aqueous liquid at the lower portion of said side walls separately from the prilled material and conducting the same from said prilling chamber.

4,028,448

METHOD OF MOLDING PLASTICS MATERIAL

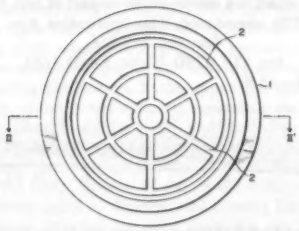
Makoto Hashimoto; Shinzi Uehara; Tadashi Sugita, all of Yokohama, and Naonori Shiina, Tokyo, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Nov. 17, 1975, Ser. No. 632,686

Claims priority, application Japan, Nov. 21, 1974, 49-134617; Nov. 21, 1974, 49-134618

Int. Cl.² B29F 3/10; B29D 9/06, 27/00

U.S. Cl. 264—37 23 Claims



1. A method of molding plastics material which comprises the steps of,

a. feeding first plastics material and second plastics material into two extruders respectively for softening and mixing, said first plastics material being substantially more difficult to thermally fuse than said second plastics material,

b. extruding through an extruder die the first plastics material in the form of a rod as a core having a diameter of at least 15mm and at the same time co-extruding the second plastics material through the same die around the periphery of said core rod as a sheath to surround said core rod,

c. charging the double structural co-extruded mass into a metal mold of which the inner walls are provided with a plurality of grooves,

d. applying pressure to the metal mold to mold the charge therein while the charge is plasticized, and,

e. taking out the molded product from the mold after the plasticization is substantially brought to an end by the cooling of the molded product.

4,028,449

PROCESS FOR PREPARING A HIGHLY EXPANDED POLYVINYL CHLORIDE FOAM PRODUCT

Haruaki Kakitani; Masao Maekawa, both of Yokkaichi, and Takashi Kokubo, Suzuka, all of Japan, assignors to Mitsubishi Monsanto Chemical Company, Tokyo, Japan

Filed Feb. 11, 1975, Ser. No. 548,924

Claims priority, application Japan, Feb. 13, 1974, 49-17313; Mar. 15, 1974, 49-29738

Int. Cl.² B29D *27/00*

U.S. Cl. 264—45.3 10 Claims

1. A process for preparing an expanded polyvinyl chloride foam, which comprises:

admixing a polyvinyl chloride resin which is prepared by emulsion polymerization of vinylchloride and a comonomer having a hydroxyl group, with a plasticizer, a crosslinking agent and a chemical blowing agent;

forming a preform of said mixture by introducing the mixture into a mold at a temperature lower than the melting temperature of said resin, wherein said melting temperature is defined as that temperature at which the crosslinkable polyvinyl chloride copolymer composition becomes a homogeneous melt by kneading at an elevated temperature;

and thereafter effecting foam expansion of the resulting molded preform by heating said preform to a temperature higher than the melting temperature of said resin.

4,028,450

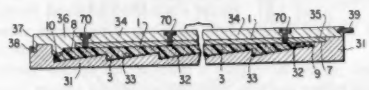
METHOD OF MOLDING A COMPOSITE SYNTHETIC ROOFING STRUCTURE

Walter M. Gould, 1731 Harriman Lane, Redondo Beach, Calif. 90278

Continuation-in-part of Ser. No. 318,288, Dec. 26, 1972, abandoned, which is a continuation-in-part of Ser. No. 45,373, June 11, 1970, abandoned. This application Apr. 19, 1974, Ser. No. 462,256

Int. Cl.² B29D *27/04*; E04D *1/20*

U.S. Cl. 264—45.5 13 Claims



1. A method of molding a composite foam synthetic resin product having a stepped portion on at least one edge thereof comprising the steps of:

introducing into a barrier coated contoured cavity of an open mold having an internal stepped section about a portion of the periphery of said cavity a foamable thermosetting resin reaction mixture;

temporarily attaching a relatively broad surface reinforcing base member into a stepped portion of a pressure plate for said mold;

placing said pressure plate with said base member attached thereto on said mold with said base member fitted into said stepped section of said mold;

securing said pressure plate to said mold, permitting said reaction mixture to foam, cure and unite to said base member;

removing said pressure plate from said mold with the composite foamed resin structure attached thereto after the thermosetting resin foam has cured; and

removing the composite foam synthetic resin product from said pressure plate.

4,028,451

METHOD OF MAKING WATER VAPOR PERMEABLE POLYMER SHEET MATERIAL

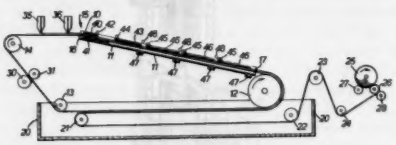
Eric Albert Warwicker, King's Lynn, England, assignor to Porvair Limited, King's Lynn, England

Division of Ser. No. 329,410, Feb. 5, 1973, Pat. No. 3,873,254, which is a division of Ser. No. 42,793, June 2, 1970, Pat. No. 3,729,536. This application Feb. 5, 1975, Ser. No. 547,125

Claims priority, application United Kingdom, June 3, 1969, 28076/69

Int. Cl.² B29D *27/04*

U.S. Cl. 264—45.8 4 Claims



1. A method of making a water vapor permeable polymer sheet material which comprises forming an initial mixture comprising elastomeric thermoplastic polyurethane dissolved in dimethylformamide with microscopic water soluble inorganic salt particles dispersed through the mixture, forming a layer at least 0.5 mm thick of the initial mixture in adherence with an endless porous fabric belt, passing the layer in adherence with said belt into contact with a body of coagulating liquid which is a solvent for said salt while the free surface of said layer is uppermost and has coagulating liquid on and over it and while said layer and belt are so supported as to prevent said layer adhered to said belt from assuming a concave transverse configuration, said layer being in contact with said body for a time sufficient to partially coagulate said layer, said layer adhering to and becoming keyed to said belt, bringing said partially coagulated layer on said belt into contact, with said free surface lowermost, with a second body of coagulating liquid non-solvent which is a solvent for said salt, said belt and layer passing through said second body until said layer is coagulated to self-supporting condition, and then stripping said self-supporting layer in sheet form from said belt, said second body of liquid being situated under said first body of liquid, said layer and belt being transferred from said first body to said second body by leading said belt carrying said adhering layer around guide means in a manner such that said free surface is held out of contact with said guide means and is prevented from assuming a concave transverse configuration.

4,028,452

ADDITIVES TO IMPROVE WETTABILITY OF SYNTHETIC PAPER PULP

Gary L. Driscoll, Boothwyn, Pa., assignor to Sun Ventures, Inc., St. Davids, Pa.

Division of Ser. No. 415,092, Nov. 12, 1973, abandoned. This application Sept. 25, 1974, Ser. No. 508,971

Int. Cl.² B29D *27/00*; D21B *1/30*

U.S. Cl. 264—51 4 Claims

1. A process for producing a synthetic thermoplastic resin pulp comprising:

a. dry blending pellets or powder synthetic thermoplastic resin with 0.1 to 5.0 percent by weight of a solid soap of a metal salt of a fatty acid containing from 7 to 24 carbon atoms and wherein the metal is lithium, sodium, calcium or aluminum;

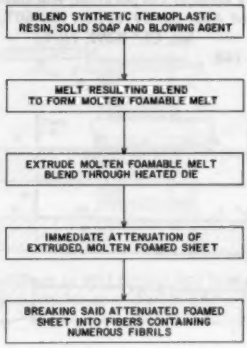
b. blending a blowing agent in the amount of from 0.1 to 20 weight percent of the resin being extruded into a blend of resin, soap, and agent to form a foamable melt;

c. melting the resulting foamable melt blend of the resin, the soap and the agent;

d. extruding the foamable melt blend into an area of re-

duced pressure through a heated die which lips are set from 5 to 100 mls apart;

e. immediately attenuating the molten extruded foamed sheet with attenuation at a rate of from 1.5 to 10 times the


BLEND SYNTHETIC THEMOPLASTIC RESIN, SOLID SOAP AND BLOWING AGENT
MELT RESULTING BLEND TO FORM MOLTEN FOAMABLE MELT
EXTRUDE MOLTEN FOAMABLE MELT BLEND THROUGH HEATED DIE
IMMEDIATE ATTENUATION OF EXTRUDED, MOLTEN FOAMED SHEET
BREAKING SAID ATTENUATED FOAMED SHEET INTO FIBERS CONTAINING NUMEROUS FIBRILS

rate linear at which the melt is extruded to induce formation of fibrils; and

f. breaking down said attenuated foamed sheet into short fibers containing numerous fibrils.

4,028,453

PROCESS FOR MAKING REFRACTORY SHAPES

Eldon D. Miller, Zelienople, and Ryan F. Washburn, Pittsburgh, both of Pa., assignors to Lava Crucible Refractories Company, Pittsburgh, Pa.

Filed Oct. 20, 1975, Ser. No. 623,741

Int. Cl.² C04B *33/32*

U.S. Cl. 264—67 **4 Claims**

2. A method of making a ceramic shape from a batch comprising nonplastic materials being free of raw clay comprising the steps for:

A. preparing a brickmaking batch comprising nonplastic size graded ceramic materials being free of raw clay said materials passing 8 mesh; 2 to 10% by weight volatilized silica; and 13 to 18 volume percent, based on the entire batch, of organic binders and lubricants selected from the group consisting of carboxymethylcellulose dextrine, polyvinylalcohol, polyethylene oxide, and mixtures thereof, and water;

B. processing the batch in a pug mill-extruder to deair and extrude a continuous column, said pug millextruder having means for maintaining the temperature of the exhusion barrel of said extruder near room temperature thereby maintaining the surface of the column near room temperature while it is being extruded;

C. cutting the column to form a billet;

D. pressing the billet to form a shape;

E. drying and firing to recover a ceramically bonded shape.

4,028,454

PROCESS FOR AGGLOMERATING COMPRESSIBLE MINERAL SUBSTANCES UNDER THE FORM OF POWDER, PARTICLES OR FIBRES

Joseph Davidovits, St. Quentin, and Jean Jacques Legrand, Aisne, both of France, assignors to Coordination et Developpement de l'Innovation Societe Anonyme en abrege Cordi, St. Quentin, France

Filed Dec. 31, 1974, Ser. No. 537,719

Claims priority, application France, Jan. 11, 1974, 74.00938

Int. Cl.² B28B *1/26, 3/00*

U.S. Cl. 264—82 **1 Claim**

1. The method of making a plate, comprising:

a. forming a mixture of clay, caustic soda and water into a moldable mass;

b. placing said mass between press platens,

c. between said mass and said platens disposing moistened layers of porous material and disposing perforated grid members between said layers and said platens,

d. pressing and mass between said layers and grid members with said platens heated to at least 150° C for a sufficient time to react said mixture and to form and cure said plate.

4,028,455

METHOD FOR PRODUCING A REDUCED-PRESSURE SHAPED MOULD

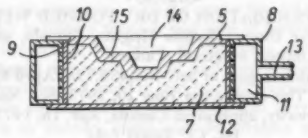
Shoji Ueda; Shuzi Ono; Hiroshi Sakaguchi, and Hideo Tsunoda, all of Nagasaki, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 17, 1975, Ser. No. 623,456

Claims priority, application Japan, Nov. 22, 1974, 49-134691

Int. Cl.² B22C *3/00;* **B29C** *17/04*

U.S. Cl. 264—89 **2 Claims**



1. A method for producing a reduced-pressure shaped mould comprising the steps of placing a pattern having gas-permeable orifices on a surface plate provided with first evacuating means, applying a coating film that is soluble in a solvent to the surface of said pattern and fixing it thereto by means of said first evacuating means, placing on the surface plate a flask provided with second evacuating means, filling the space portion defined by the coating film and the flask with solid particles, containing no caking agent, which serves as mould material, covering the surface of said mould material with an air-tight sheet, releasing the reduced pressure within the surface plate while evacuating the interior of said flask with the second evacuating means to make the air-tight sheet and the coating film adhere to the upper and lower surfaces, respectively, of the mould material, separating the pattern and the surface plate from the flask, and thereafter applying a solution, containing caking agent dissolved in the said solvent, to the coating film, which is adhered to the surface of a cavity formed at the lower surface of the mould material to enable the said caking agent to dissolve said coating film and penetrate interstices between the solid particles, and evaporating and removing said solvent whereby a layer that has been hardened by the said caking agent and coating film material is formed in a surface layer portion of the mould material bounding the cavity.

2. A mould shaped by the method according to claim 1.

4,028,456

METHOD OF EXTRUDING A WEATHERSTRIP HAVING A PILE STRIP

Earl V. Lind, Rochester, N.Y., assignor to Schlegel Corporation, Rochester, N.Y.

Division of Ser. No. 446,301, Feb. 27, 1974, Pat. No. 3,923,576. This application July 21, 1975, Ser. No. 597,408

Int. Cl.² B29D *3/00, 9/00, 23/04;* **B29F** *3/00*

U.S. Cl. 264—90 **2 Claims**

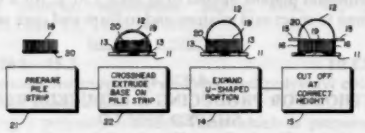
1. A weatherseal making method comprising:

a. preparing a long, thin strip of pile material;

b. cross-head extruding a resin base having a relatively thick, generally flat support portion formed on the back

of said pile strip and a relatively thin portion U-shaped in cross section and joined to opposite side edge regions of one face surface of said support portion and arching over said pile strip;

c. while said resin material is still plastic, producing a substantially lower pressure outside said U-shaped portion



than inside said U-shaped portion to expand said U-shaped portion away from said support portion and reduce the thickness of the wall of said U-shaped portion; and

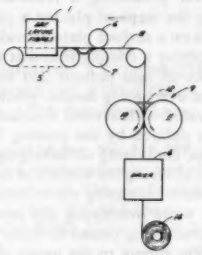
d. setting said resin material with said U-shaped portion expanded over said pile strip.

4,028,457

CONSOLIDATION OF DRY FORMED WEBS

Roger George Davey, Hudson Heights, Canada, assignor to Domtar Limited, Montreal, Canada

Continuation-in-part of Ser. No. 458,798, April 8, 1974, abandoned. This application June 20, 1975, Ser. No. 588,881
Claims priority, application Canada, Apr. 16, 1973, 168790
Int. Cl.² D04H *1/64*
U.S. Cl. 264—120 **7 Claims**



1. A method of continuously making a dry formed consolidated sheet of paper comprising:

a. dry forming fibres to form a continuous web, said fibres being predominantly discrete cellulose fibres previously liberated by chemical digestion of cellulosic material;

b. continuously passing said web containing 4 to 25% moisture based on the weight of said fibres between a pair of press rolls at a pressure of 500 – 3,000 lbs. per lineal inch and prebonding said fibres together thereby to impart sufficient strength to said web to enable it to pass through the nip of a size press when said web is substantially saturated with a binder in a liquid carrier but without significantly imparting the ability of said web to be impregnated by said binder in said liquid carrier;

c. continuously applying said binder in said liquid carrier to said prebonded web, the amount of said binder in said liquid carrier being sufficient to saturate said web in said nip;

d. continuously passing said prebonded web through said nip of said size press at a nip pressure of 20 to 150 lbs. per linear inch and at a speed of at least 50 ft. per minute said binder in said liquid carrier being at a temperature of 15 – 80° C thereby to distribute said binder substantially uniformly throughout said web and;

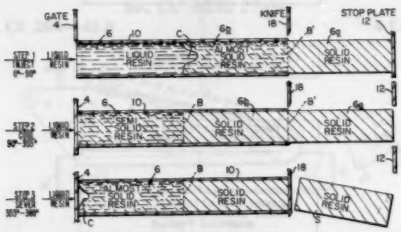
e. drying said web to form a continuous bonded consolidated sheet of paper.

4,028,458

METHOD FOR MAKING HOT MELT ADHESIVE STICKS AND OTHER SHAPES

Ray H. Wallace, Rockland, Mass., assignor to Transworld Adhesive & Chemical Corporation, Rockland, Mass.

Filed Aug. 25, 1975, Ser. No. 607,097
Int. Cl.² B29F *1/04*
U.S. Cl. 264—148 **5 Claims**



1. The method of making hot melt adhesive sticks comprising the steps of

A. intermittently injecting a charge of liquid adhesive into one end of a cooling chamber under sufficient pressure to eject a portion of a solidified shape resulting from the cooling of a previous adhesive charge, from the opposite end of the chamber,

B. preventing complete ejection of the solidified shape from the chamber thereby limiting the size of the liquid charge into the chamber and preventing leakage of liquid adhesive from said opposite end of the chamber,

C. severing the portion of the shape protruding from said opposite end of the chamber from its trailing end which plugs said opposite end of the chamber, and wherein said process comprises the additional steps of

maintaining the injecting charge under pressure until its outside wall forms and sets so that any resin shrinkage that occurs takes place at the trailing end of the charge where it can be made up by a succeeding resin charge into the chamber, and

interrupting the injection of liquid adhesive into the chamber after the solidified shape is partially ejected from the chamber.

4,028,459

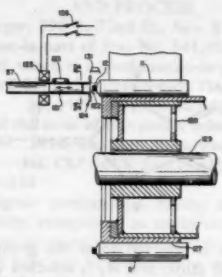
METHOD FOR PROTECTIVELY COVERING CONTAINER NECKS

Dusan S. LaJovic, Smithfield, Australia, assignor to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 340,293, March 12, 1973, Pat. No. 3,909,182. This application Apr. 25, 1975, Ser. No. 571,512
Claims priority, application Australia, Oct. 2, 1969, 61800/69; Oct. 13, 1969, 62213/69
Int. Cl.² B29C *17/00, 27/00;* **B29F** *5/00*
U.S. Cl. 264—159 **11 Claims**

1. A continuous method for applying covering elements of heat shrinkable plastics material upon articles comprising the steps of positioning articles in succession at an element applying station, periodically longitudinally advancing the open leading end of a length of tubing of said material toward articles positioned at said station, during said advancing moving said tubing over a mandrel to expand the leading end of the tubing to tubular form, periodically severing said tubing near said open end in timed relation with advance of said tubing to provide a succession of tubular elements of desired length each separated from said tubing and positioned in

alignment with an article at said station, axially advancing a severed tubular element onto an article at said station during



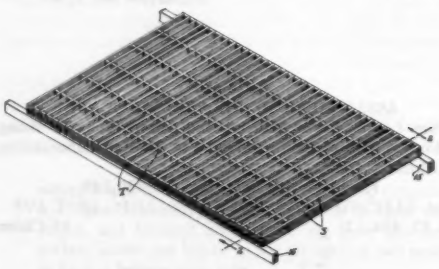
each period of advance of said tubing, and heat shrinking said elements onto said articles at said station.

4,028,460

METHOD FOR MAKING FIBER REINFORCED RESIN GRATING

Leonard S. Meyer, Columbia, S.C., assignor to Sybron Corporation, Rochester, N.Y.

Division of Ser. No. 110,076, Jan. 27, 1971, Pat. No. 3,704,561. This application June 21, 1972, Ser. No. 266,520
Int. Cl.[2] B29D *3/02*; B29G *7/00*
U.S. Cl. 264—263 2 Claims



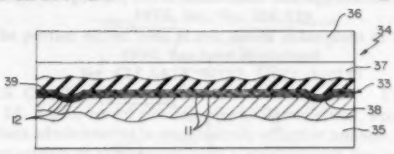
1. A method for making a grating having two sets of bars with the bars of one set parallel to each other and intersecting the bars of the other set, comprising introducing hardenable liquid resin in a mold having two sets of parallel intersecting cavities for molding the two sets of bars of the grating, placing a set of preformed fiber reinforced solidified resin strips in the parallel cavities of one of said sets of cavities in the mold, placing another set of preformed fiber reinforced solidified resin strips in the set of cavities of the other parallel set of cavities in the mold in positions overlying the strips of the first set, alternately placing additional sets of similar strips in each of the sets of cavities to provide interleaving strips in the positions of each of the sets of bars of the grating being formed, each set of said strips being submerged in liquid resin previously introduced into the mold cavities, and hardening said liquid resin with the strips embedded therein.

4,028,461

METHOD OF MAKING A PLURALITY OF SUBSTANTIALLY IDENTICAL FLEXIBLE DIAPHRAGMS

Rolf H. Ochsner, Trumbull, Conn., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Sept. 5, 1975, Ser. No. 610,664
Int. Cl.[2] B29D *9/00*
U.S. Cl. 264—297 2 Claims



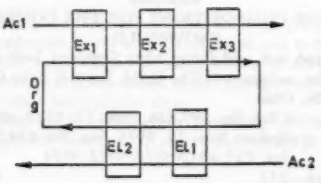
1. A method of making a plurality of substantially identical flexible diaphragms for control devices or the like comprising the steps of providing a plurality of sheets of polyester film each being approximately 0.0005 to 0.0010 of an inch thick and each being a circular disc approximately four and one-half inches in diameter, and forming said diaphragms from said sheets so that each diaphragm has an annular corrugation formed therein concentric with the center thereof and inboard of the outer periphery thereof, said step of forming said diaphragms comprising the steps of disposing said sheets in stacked aligned relation in a mold, and compressing and heating said sheets in said mold in said stacked aligned relation to substantially simultaneously heat form said corrugations in said sheets to thereby make said diaphragms substantially identical to each other.

4,028,462

METHOD OF EXTRACTION INVOLVING THE USE OF SOLVENTS AND NEW COMBINATION OF REACTORS USED

Esteban Domic; Albert Sfeir, and Jorge Sandoval, all of Santiago, Chile, assignors to Corporacion de Fomento de la Produccion, represented by Comite de Investigaciones Technologicas, Santiago, Chile

Continuation-in-part of Ser. No. 392,216, Aug. 28, 1973, abandoned. This application May 22, 1975, Ser. No. 580,038
Claims priority, application Chile, Aug. 28, 1972, 609-72
Int. Cl.[2] C22B *15/00*, *3/00*
U.S. Cl. 423—24 9 Claims



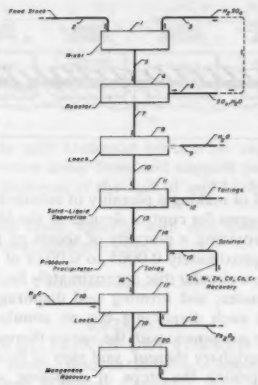
1. In a liquid-liquid extraction process for the extraction of a constituent from an aqueous solution through the use of an organic solvent, in which process said constituent is extracted from the aqueous feed solution into said organic solvent and backwashed into an aqueous elution solution, wherein successive extraction and successive elution contacts occur, the improvement comprising

partially discharging said constituent from said organic solvent through contact of said organic solvent with said aqueous elution solution after each extraction contact.

4,028,463
RECOVERY OF MANGANESE VALUES

John C. Stauter, Itasca, and Richard T. Um, Mount Prospect, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Feb. 19, 1976, Ser. No. 659,392
Int. Cl.² C01G 45/10
U.S. Cl. 423—52 4 Claims



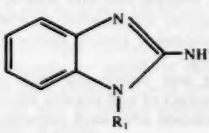
1. In a process for the recovery of manganese values from a manganese bearing source, the steps of:
   a. forming a mixture of said manganese bearing source, sulfuric acid and a reductant comprising a chromium-containing compound in a weight ratio of from about 1:1:1 to about 2:1:10 manganese bearing source, chromium-containing compound and sulfuric acid, respectively;
   b. roasting said mixture at a temperature of from about 200° to about 500° C. for a sufficient time to remove the major portion of its water content and excess sulfuric acid;
   c. leaching the resultant pulp with water at a temperature of from about 25° to about 95° C;
   d. filtering the leach solution to separate undissolved solids from pregnant leach liquor containing dissolved manganese ions and chromium ions;
   e. selectively extracting the chromium ions from said pregnant leach liquor with an organic amine solvent; and
   f. precipitating manganese as solid manganese sulfate from the remaining leach liquor by subjecting the latter to a pressure of from about 50 to about 500 pounds per square inch at a temperature of from about 130° to about 250° C.

4,028,464
FUNGICIDE COMPOSITIONS FOR THE CONTROL OF SNOWMOLD

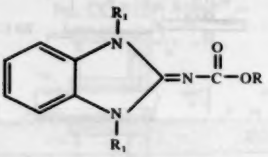
Robert Joseph Bell, and James Almy Simmons, both of Marysville, Ohio, assignors to The O. M. Scott & Sons Company, Marysville, Ohio

Continuation of Ser. No. 397,826, Sept. 17, 1973, abandoned. This application Nov. 24, 1975, Ser. No. 634,907
Int. Cl.² A01N 9/12, 9/22, 9/24
U.S. Cl. 424—273 11 Claims

1. A fungicidal composition for the control of snowmold comprising
   a. 1,4-dichloro-2,5-dimethoxybenzene and
   b. a compound selected from the group consisting of
      1. a benzimidazole of the formula

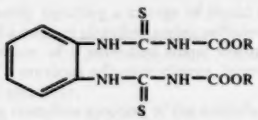


a benzimidazole of the formula



wherein R is selected from the group consisting of methyl and ethyl; and R_1 is selected from the group consisting of hydrogen and butyl carbamoyl, and

2. a thiophanate of the formula



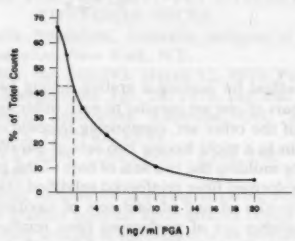
in which R is selected from the group consisting of methyl and ethyl,

the ratio by weight of compound (a) to compound (b) ranging from 10:1 to 1:1.

4,028,465
ASSAY METHOD FOR SERUM FOLATE

Nathan Lewin, Corte Madera, and Emmy Tong-In Wong, Moraga, both of Calif., assignors to Bio-Rad Laboratories, Richmond, Calif.

Filed Nov. 10, 1975, Ser. No. 630,249
Int. Cl.² C07D 475/00; G01N 31/06, 33/16; G01T 1/16
U.S. Cl. 424—1 15 Claims



1. In the assay for serum folate by competitive binding in which endogenous serum folate binding proteins are inactivated by heat prior to the competitive binding step, the improvement in which said sera are heated in the presence of a buffered solution containing a stabilizing amount of a dithiopolyol having 4–6 carbon atoms.

4,028,466

ANALGESIC COMPOSITIONS COMPRISING DEXTRO-PROPOXYPHENE AND BENZODIAZEPINE AND PROCESS

Frank M. Berger, 190 E. 72nd St., New York, N.Y. 10021

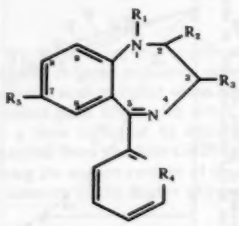
Continuation-in-part of Ser. No. 541,968, Jan. 7, 1975, abandoned, which is a continuation-in-part of Ser. No. 463,350, April 23, 1974, abandoned. This application Mar. 10, 1976, Ser. No. 665,595

The portion of the term of this patent subsequent to Apr. 12, 1994, has been disclaimed.

Int. Cl.[2] A61K *31/22, 31/33*

U.S. Cl. 424—244 18 Claims

1. An analgesic composition having a remarkably high analgesic activity, comprising as analgesically active components, α, d-propoxyphene or pharmaceutically acceptable salt thereof and at least one benzodiazepine or pharmaceutically acceptable salt thereof, in an amount within the weight ratio range of α, d-propoxyphene:benzodiazepine from 100:0.5 to 2:1, the benzodiazepine enchancing the analgesic activity of the α, d-propoxyphene when administered separately, the benzodiazepine having the formula:



wherein:

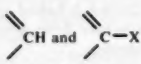
R_1 is selected from the group consisting of hydrogen, n-butyl, and alkylamino

where R and R′ are selected from the group consisting of hydrogen, lower alkyl having from one to three carbon atoms, and bivalent alkylene having from two to four carbon atoms and linked to the nitrogen at two positions to form a heterocyclic ring;

R_2 is selected from the group consisting of oxo oxygen = O and hydroxyl OH;

R_3 is selected from the group consisting of hydrogen, hydroxyl OH and carboxyl COOH;

R_4 is selected from the group consisting of



where X is Cl or F; and

R_5 is selected from the group consisting of hydrogen, Cl and F.

4,028,467

ANALGESIC COMPOSITIONS COMPRISING LEVO-PROPOXYPHENE AND BENZO DIAZEPINE AND PROCESS

Frank M. Berger, 190 E. 72nd St., New York, N.Y. 10021

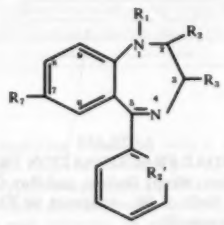
Continuation-in-part of Ser. No. 541,968, Jan. 17, 1975, abandoned, which is a continuation-in-part of Ser. No. 463,350, April 23, 1974, abandoned. This application June 12, 1975, Ser. No. 586,329

The portion of the term of this patent subsequent to Apr. 12, 1994, has been disclaimed.

Int. Cl.[2] A61K *31/22, 31/33, 31/235*

U.S. Cl. 424—244 17 Claims

15. A process for obtaining an analgesic effect, which comprises administering in analgesically effective amount levopropoxyphene or pharmaceutically acceptable salt thereof and at least one benzodiazepine or pharmaceutically acceptable salt thereof, each in an amount within the weight ratio range of levopropoxyphene:benzodiazepine of from 100:0.5 to 2:1 imparting analgesic activity to the other, neither the levopropoxyphene nor the benzodiazepine when administered separately displaying analgesic activity, the benzodiazepine having the formula:



wherein:

R_1 is selected from the group consisting of hydrogen, alkyl,

and amino or alkylamino

in which R and R′ are selected from the group consisting of hydrogen, lower alkyl having from one to three carbon atoms, and bivalent alkylene having from two to four carbon atoms; and linked to the nitrogen at two positions to form a heterocyclic ring;

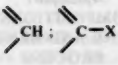
R_2 is selected from the group consisting of hydrogen, oxo oxygen=O hydroxyl OH, alkyl, and amino or alkylamino

where R and R′ are as defined above;

R_3 is selected from the group consisting of hydrogen, hydroxyl OH and carboxyl COOH;

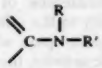
R_7 is selected from the group consisting of hydrogen, halogen and nitro NO_2; and

R_2' is selected from the group consisting of



where X is halogen

and amino or alkylamine



where R and R' are as defined above.

4,028,468

OAT GROAT FRACTIONATION PROCESS

Gary Arlyn Hohner, Sleepy Hollow, and Roy Godfrey Hyldon, Crystal Lake, both of Ill., assignors to The Quaker Oats Company, Chicago, Ill.

Filed Oct. 1, 1975, Ser. No. 618,476
Int. Cl.² A23J 1/12
U.S. Cl. 426—436 **18 Claims**

1. In a process of fractionating oats comprising:

I. obtaining dried, dehulled oat groats;

II. grinding the oat groats to form an oat flour containing a dense, fine fraction of regularly shaped particles and a light, coarse fraction of irregularly shaped particles wherein the coarse fraction comprises oat bran, oat gum, oat protein and oat starch;

III. recovering the flour;

IV. separating the coarse fraction and the fine fraction;

V. recovering the coarse fraction; the improvement further comprising:

a. forming a heated, basic slurry of the recovered coarse fraction of the oat flour in a liquid;

b. agitating the heated, basic slurry to carry out an extraction and to form a bran fraction and a soluble fraction containing the oat gum, the oat protein and the oat starch by the extraction of the coarse fraction;

c. recovering the oat bran from the slurry while leaving the oat gum, the oat protein, and the oat starch in the soluble fraction to thereby form an alkaline extract of the soluble fraction;

d. chilling the alkaline extract to a temperature in the range from above the freezing point of the alkaline extract to ambient temperature;

e. acidifying the chilled alkaline extract to form a precipitate of oat protein;

f. removing the protein precipitate and the starch from the extract to form a supernatant liquid containing the oat gum to thereby recover the protein precipitate and the starch;

g. neutralizing the supernatant liquid;

h. heating the neutralized supernatant liquid to at least 90° C.; and

i. recovering the oat gum.

4,028,469

BREAD CONTAINING ALFALFA

David Kritchevsky, 136 Lee Circle, Bryn Mawr, Pa. 19010; Hilary Koprowski, 334 Fairhill Road, Wynnewood, Pa. 19096, and Hanna Makolska, 3900 Chestnut St., Apartment 928, Philadelphia, Pa. 19104

Filed May 10, 1976, Ser. No. 684,571
Int. Cl.² A21D 10/00
U.S. Cl. 426—551 **11 Claims**

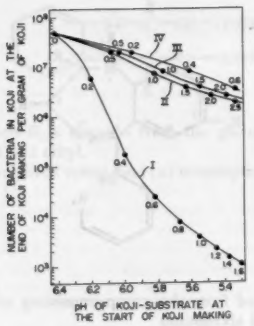
1. A composition for preparing bread comprising a farinaceous dough containing a leavening agent and alfalfa, said alfalfa being present in an amount of from about 3.5 to 10% by weight.

4,028,470

PROCESS FOR PRODUCING KOJI FOR FERMENTED FOOD PRODUCTS

Kazuya Hayashi, Kashiwa; Takeji Mizunuma, Noda, and Tamotsu Yokotsuka, Nagareyama, all of Japan, assignors to Kikkoman Shoyu Co., Ltd., Japan

Filed June 8, 1976, Ser. No. 693,762
Claims priority, application Japan, June 18, 1975, 50-73167
Int. Cl.² A23L 1/20, 1/238
U.S. Cl. 426—11 **8 Claims**



1. A process for producing koji for fermented food products which comprises

inoculating a koji mold in a modified koji-substrate composed of a vegetable protein material and a vegetable carbohydrate material and selected from the group consisting of steamed koji-substrate, puffed koji-substrate and roasted koji-substrate, and

cultivating the koji mold in the presence of 0.1 to 1.2% by weight, based on the water content of the modified koji-substrate of acetic acid at a pH of about 4 to 7.5, a temperature of about 20° to about 40° C and for a time sufficient to produce koji for fermented food products.

4,028,471

YEAST LEAVENED DOUGH COMPOSITION

Jack Kern Krum, Leawood; Louis Albert Wollermann, Prairie Village, both of Kans., and Dugan Allan Rucker, Kansas City, Mo., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Dec. 1, 1975, Ser. No. 636,848
Int. Cl.² A21D 2/20
U.S. Cl. 426—22 **7 Claims**

1. A process for preparing a baked product of improved resiliency and crumb structure from a yeast leavened dough composition which comprises

adding to said composition, for each 100 parts by weight of flour, an additive comprising from 0.0020 to 0.0120 parts by weight of a peroxide oxidizing agent and from 0.0025 to 0.090 parts by weight of a sorbate selected from the group consisting of sorbic acid and the sodium, potassium

and calcium salts of sorbic acid, the ratio of peroxide to sorbate being no greater than one with more than 0.0075 parts by weight of peroxide, and

baking said dough composition, whereby a yeast leavened baked product is produced capable of being more thinly sliced than a baked product not containing said additive.

4,028,472

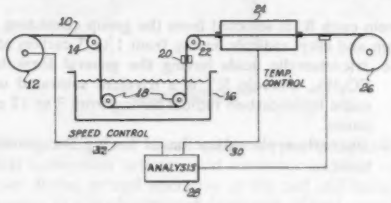
METHOD FOR ANALYSIS OF TREATED GLASS FIBERS

Klaus D. Rosinski, Granville, and John W. Schroer, Newark, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Division of Ser. No. 306,279, Nov. 13, 1972, Pat. No. 3,900,584. This application Apr. 14, 1975, Ser. No. 567,659

Int. Cl.² C03C 25/02; G01N 31/12

U.S. Cl. 427—8 12 Claims



1. A method for determining the degree of cure of glass fibers coated with a heat-cured polymeric material containing water-soluble carbonaceous material when cured comprising contacting the coated glass fibers with water at an elevated temperature for a time sufficient to extract water-soluble carbonaceous material from the heat-cured polymeric material and determining the carbon content of the resulting aqueous extract as a measure of the degree of cure.

4,028,473

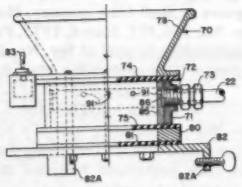
HYDRAULIC POWERED LUBRICATOR AND SPRAYER

Armand R. Conti, 3464 N. Wendover Circle, Youngstown, Ohio 44511

Continuation-in-part of Ser. No. 577,698, May 15, 1975, abandoned. This application Feb. 17, 1976, Ser. No. 658,353

Int. Cl.² B05C 3/02; G01F 11/02

U.S. Cl. 427—434 E 12 Claims



1. Apparatus powered by hydraulic fluid pressure for the delivery of liquid and semiliquid materials, such as a viscous fluid, a thixotropic gel or a gel-type grease, said apparatus including the combination of:

means for pressurizing hydraulic fluid,

a hydraulic motor powered by the pressurized hydraulic fluid,

valve means for controlling said hydraulic motor,

a container forming a supply reservoir for said liquid and semiliquid materials,

pump means driven by said hydraulic motor to withdraw the material from the container while pressurizing the withdrawn material,

an open-ended collar having an open discharge orifice in the side wall thereof,

a conduit line to interconnect said pump means with the open discharge orifice of said discharge means for discharging pressurized material,

resilient wiper means at the opposite ends of said collar to form an internal chamber wherein the pressurized material delivered by said conduit line is discharged from said open orifice onto the surface of an article while passing through the collar between said resilient wiper means, and

means to control the discharge of the material from said open discharge orifice only by controlling the pressurization of the material by said pump means.

4,028,474

WEATHERPROOF DECAL

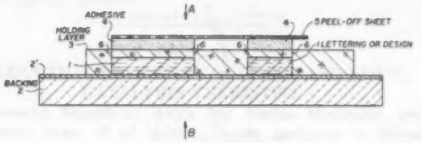
Francois Martin, c/o Ste d'Exploitation des Procedes F. Martin dite SEPMA, Oursbelille 65 490, France

Continuation of Ser. No. 430,488, Jan. 3, 1974, abandoned. This application Mar. 1, 1976, Ser. No. 662,547

Claims priority, application France, Jan. 3, 1973, 73.00529

Int. Cl.² B32B 3/22, 7/02, 7/06, 7/14; C09J 7/02

U.S. Cl. 428—40 7 Claims



1. A decal comprising a backing with a smooth surface, lettering or designs of given contours placed on said smooth surface preferably in reverse fashion, anchoring means comprising a substantially dried adhesive material, and anchoring means covering said lettering or designs and said smooth surface, an edge of reduced thickness in said anchoring means, said edge extending at said contours of the lettering or designs, said anchoring means securing the lettering or designs to said smooth surface and in position relative to each other, and an adhesive layer covering said anchoring means only in the areas of said lettering or designs, said adhesive layer and said anchoring means being composed of the same adhesive agent, said adhesive layer having a greater adhesive strength than said anchoring means due to the dispersion of talcum and a mineral oil in the composition of the anchoring means and not in the adhesive layer, whereby the adhesive layer sticks more strongly than the anchoring means to facilitate the ripping of the anchoring means along said edge when the decal is transferred from the backing to a surface.

2. The decal according to claim 1, further comprising a peel-off sheet on said adhesive layer.

4,028,475

SECURITY FILM FOR SHATTERPROOFING WINDOWS

Michael E. Willdorf, Malden, Mass., assignor to Material Distributors Corporation, Woburn, Mass.

Filed May 21, 1975, Ser. No. 579,388

Int. Cl.² B32B 17/08; B60J 1/06, 3/00; B32B 15/08

U.S. Cl. 428—215 2 Claims

1. A security film comprising as laminated components:

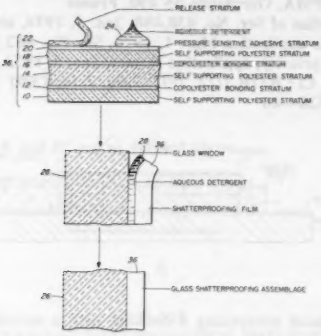
a. from two to five self-supporting strata, each of said self-supporting strata ranging in thickness from 1 to 3 mils and being composed of biaxially oriented polyethylene terephthalate;

b. a plurality of inner bonding strata laminating said self-supporting strata together, each of said inner bonding strata ranging in thickness from 0.1 to 0.3 mil and consisting essentially of a copolymer of polyethylene terephthalate;

c. a pressure-sensitive adhesive stratum on one face of said self-supporting strata, said pressure sensitive adhesive

stratum ranging in thickness from 4 to 15 times the thickness of one of said inner bonding strata and consisting essentially of 15 to 30 parts of an acrylic resin and from 2.5 to 7.5 parts of a polyene tackifier wherein said pressure-sensitive stratum is characterized by a 72° F rolling ball test value ranging from 1/16 to 6 inches, a 72° F static sheer value ranging between 1 and 5 hours, and by a 180° F static peel test value ranging between 7.5 and 75 ounces;

d. all of the strata of said security film being optically clear and the overall thickness of said security film ranging in thickness from 3 to 6 mils wherein the thickness of said inner bonding strata is from 6 to 18 percent of said overall thickness and the thickness of said pressure-sensitive adhesive stratum ranges from 13 to 26 percent of said overall thickness;



e. whereby said laminated components provide sufficient overall flexibility to permit high incremental pressure when squeegeed onto a glass window, sufficient tensile modulus, impact strength and tear strength imparted by said self-supporting strata to preclude rupture while distributing shock; particular adhesion, cohesion, compatibility and resilience to withstand shock without failure, characteristic modulus of rigidity at the discontinuities between said self-supporting strata and said inner bonding strata to damp vibratory energy transfer, and particular adhesion, cohesion, compatibility and resilience imparted by said pressure sensitive bonding stratum to catch and retain glass chards produced by deformation of a laminated combination of said security film and a glass window at the moment of an impact.

4,028,476

TRANSPARENT POLYAMIDE ARMOR

Roger F. Kleinschmidt, and Robert W. Campbell, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

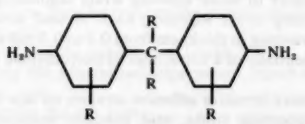
Continuation of Ser. No. 489,748, July 18, 1974, abandoned. This application Oct. 22, 1975, Ser. No. 624,619

Int. Cl.² B32B *27/34;* **F41H** *5/02, 5/06, 5/08*

U.S. Cl. 428—220 **17 Claims**

1. A lightweight, transparent armor shield having a thickness of about 1/32 inch to about 2 inches, consisting essentially of a transparent, substantially amonphouse polymeric material having an inherent viscosity of at least about 0.6 formed by the polymerization of:

A. at least one compound having the general formula

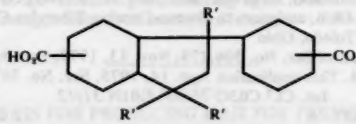


wherein each R is individually selected from the group consisting of hydrogen and $-CH_3$; and

b. at least one polycarboxylic acid having from 6 to 26 carbon atoms per molecule selected from the group consisting of:

a. straight chain dicarboxylic acids having from 6 to 18 carbon atoms,

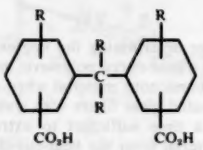
b. phenylidane dicarboxylic acids having the general formula



wherein each R′ is selected from the group consisting of hydrogen and alkyl radicals having from 1 to 3 carbon atoms;

c. tricarboxylic acids having the general formula r″($-CO_2H)_3$, wherein R″ is a trivalent saturated or aromatic hydrocarbon radical having from 3 to 12 carbon atoms,

d. bis(carboxyphenyl)methanes having the general formula



wherein R is —H or $-CH_3$, and

e. mixtures thereof wherein an armor shield having a thickness of about ¼ inch is capable of having a ᵛ50 rating of at least about 878 fps, as determined according to MID-STD-662A, when fired at by a .22 califre 17-grain fragment-simulating projectile.

4,028,477

METHOD OF PRODUCING AN ARTICLE OF THERMOSETTING RESIN

Johan M. Goppel, and Peter R. Chant, both of Delft, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 366,381, June 4, 1973, Pat. No. 3,915,783, which is a continuation-in-part of Ser. No. 208,937, Dec. 16, 1971, abandoned. This application Mar. 6, 1975, Ser. No. 556,075

Int. Cl.² B32B *5/18*

U.S. Cl. 428—285 **4 Claims**

1. A rigid laminated article comprising a dense compressed cellular foam core interposed between fibrous layers uniformly impregnated throughout their respective thickness with a hardened thermosetting resin, said foam core having substantially all of the open cell space therein filled with a hardened thermosetting resin and being bound to said resin-impregnated fibrous layers through said hardened thermosetting resin.

4,028,478

SAFETY SWITCH FOR SEALED GALVANIC CELLS

Gary Ronald Tucholski, Parma Heights, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed May 24, 1976, Ser. No. 689,524

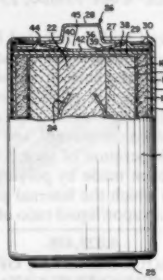
Int. Cl.² H01M *2/00*

U.S. Cl. 429—61 **6 Claims**

1. A sealed galvanic cell assembly comprising in combination:

a cylindrical metal container including a positive and negative electrode and an electrolyte, with said container being in electrical contact with said positive electrode;

an outer cover mounted over said metal container and being of a predetermined configuration to form a substantially centrally located cavity between said cover and said container;



switch means disposed in said cavity for providing an electrical connection between said container and said outer cover during normal operation of the cell and being responsive to a predetermined expansion of said container for irreversibly breaking such electrical contact;

said switch means being held in a slidable relationship with said container and cover and comprising an electrically conductive spring member having an inclined deformable section and a substantially centrally disposed opening.

4,028,479

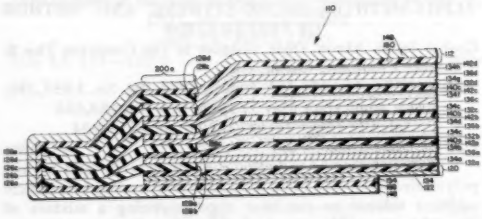
FLAT BATTERY

Ralph D. Fanciullo, Waltham, and Ludwig G. Fasolino, Wellesley, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 536,379, Dec. 26, 1974, abandoned, which is a continuation-in-part of Ser. No. 478,061, June 10, 1974, Pat. No. 3,907,599. This application Jan. 27, 1976, Ser. No. 652,735

Int. Cl.² H01M 6/48

U.S. Cl. 429—152 **18 Claims**



1. In a thin planar battery having a multiplicity of discrete electrically conductive polymeric layers arranged in cooperative electrical association with one another to form a multicell battery, the improvement comprising:

continuous frame-type electrically insulative sheet sealing means providing an opening defined by an inner border and having a first surface bonded to a peripheral surface of each discrete electrically conductive polymeric layer, said sheet sealing means extending outwardly from the periphery of the so bonded electrically conductive layer to define a continuous border sealing portion; and

discrete, sheet-type separator means positioned between the electrically conductive layers and having a periphery extending beyond the sealing means inner opening and within said border sealing portion which periphery is bonded to the surface of the sealing means opposite the first surface.

4,028,480

PHOTODEGRADABLE POLYMER COMPOSITIONS

Genevieve Le Brasseur, Bully les Mines, France, assignor to Societe Chimique des Charbonnages - CdF Chimie, Paris, France

Filed Apr. 15, 1976, Ser. No. 677,377

Claims priority, application France, Apr. 17, 1975, 75.12000

Int. Cl.² C08J 3/20

U.S. Cl. 526—3 **6 Claims**

1. A photodegradable polymer composition comprising at least one polymer selected from the group consisting of polyethylene and polystyrene and copolymers thereof and from 1 to 500 ppm based on the polymer of ferrous iron in the form of a salt of a carboxylic acid, said acid having an alkyl chain containing at least 6 carbon atoms and being substituted in at least one of the second, third, fourth or fifth positions relative to the acid group with at least one of the radicals selected from the group consisting of carboxylic acid, sulphonic acid, alcohol and amide radicals.

4,028,481

PRODUCTION OF OLEFIN POLYMERS AND NOVEL CATALYSTS THEREFORE

Tetsunosuke Shiomura; Akiro Ito; Yoshio Morimoto, and Tetsuya Iwao, all of Nagoya, Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Continuation of Ser. No. 153,791, June 16, 1971, abandoned. This application Aug. 6, 1973, Ser. No. 385,665

Claims priority, application Japan, June 18, 1970, 45-52420; July 31, 1970, 45-66627; Nov. 6, 1970, 45-97711; Dec. 28, 1970, 46-129938; Dec. 28, 1970, 46-129934; Dec. 28, 1970, 46-129935; Dec. 29, 1970, 46-129922; Dec. 29, 1970, 46-129924

Int. Cl.² C08F 4/66, 10/06

U.S. Cl. 526—142 **17 Claims**

1. A catalyst composition useful for polymerizing α-olefins comprising:

A. An activated titanium trichloride component obtained by copulverizing a titanium trichloride composition with a complex or reaction product of an aluminum halide and at least one organic oxygen-containing compound selected from the group consisting of oxyethers, carboxylic esters and oxyketones and washing the product of copulverization with a solvent selected from the group consisting of aliphatic, cycloaliphatic and aromatic hydrocarbons, their halogen derivatives and mixtures thereof; and

B. an organoaluminum compound.

4,028,482

POLYMERS OF ACID ANHYDRIDE TYPE NORBORNENE DERIVATIVES AND A METHOD OF PREPARING THE SAME

Takashi Ueshima, Yokohama; Yasuzi Tanaka, Kawasaki, and Shoichi Kobayashi, Yokohama, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 19, 1974, Ser. No. 507,556

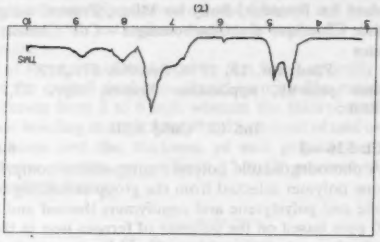
Claims priority, application Japan, Sept. 25, 1973, 48-106902

Int. Cl.² C08F 5/00, 1/42

U.S. Cl. 526—271 **1 Claim**

1. Resinous homopolymers prepared with a reduced viscosity of 0.1 to 20 measured at 30° C in a 1% by weight aqueous solution of sodium carbonate with the concentration of the polymers fixed at 0.2g/dl by ring-opening polymerization of acid anhydride type norbornene derivatives having a carboxylic anhydride group and selected from the group consisting of 3,6-methylene-1,2,3,6-tetrahydro-cis-phthalic anhydride; 6-(5-carboxy-bicyclo[2,2,1]-hepta-2-enyl) acetic anhydride;

3,6-methano-1-methyl-1,2,3,6-tetrahydro-cis-phthalic anhydride;2-oxa-1,4-dioxo-5,8-methano-1,2,3,4,4*a*,5,8,8*a*-octahydro-naphthalene; 5,8-methano-1,2,3,4,4*a*,5,8,8*a*-octahydronaphthalene-1,2-dicarboxylic anhydride; 5,8-methano-1-methyl-1,2,3,4,4*a*,5,8,8*a*-octahydronaphthalene-2,3-dicar-



boxylic anhydride; 1,4,5,8-dimethano-1,2,3,4,4*a*,5,8,8*a*-octahydro-naphthalene-2,3-dicarboxylic anhydride; 2-oxa-1,3-dioxo-1,2,3,4,4*a*,5,8,8*a*,9,9*a*,10,10*a*-dodecahydroanthracene and 4-(5-bicyclo[2,2,1]-hepta-2-enyl) phthalic anhydride.

4,028,483

EPDM INTERPOLYMERS FORMED WITH UNSATURATED ORGANOSILANES

William C. Bond, Jr., and Harold J. Wahlborg, both of Baton Rouge, La., assignors to Copolymer Rubber & Chemical Corporation, Baton Rouge, La.

Continuation-in-part of Ser. No. 592,381, July 2, 1975, abandoned, which is a continuation-in-part of Ser. No. 340,221, March 21, 1973, abandoned, which is a continuation of Ser. No. 102,929, Dec. 30, 1970, abandoned. This application Sept. 8, 1975, Ser. No. 610,987

Int. Cl.² C08F *30/08, 130/08, 15/40, 4/44*

U.S. Cl. 526—279 **16 Claims**

1. An interpolymer which is the product of the interpolymerization in the presence of a Ziegler type catalyst of monomers consisting essentially of (1) ethylene, (2) a monoolefin having from 3 to 20 carbon atoms, (3) a polyene selected from the group consisting of an open chain polyunsaturated hydrocarbon having from 4 to 20 carbon atoms and a polyunsaturated bridged ring hydrocarbon, and (4) an ethylenically unsaturated organosilane having the general formula R_nSiX_{4-n} in which X is a highly hydrolyzable group selected from the group consisting of a halogen and a tertiary amine, *n* is an integer from 1 to 3, and R is a group selected from the group consisting of hydrogen, alkyl, aryl, alkaryl, arylalkyl, cyclic or heterocyclic group, in which at least one of the R groups is a norbornenyl group, in which the ethylene and monoolefin are present in the interpolymer in the mole ratio of 20-95 moles ethylene to 80-5 moles monoolefin, the polyene is chemically bound in the interpolymer in an amount within the range of 0.1 to 10 mole percent of the total number of moles of ethylene, monoolefin and polyene, and the unsaturated organosilane is present in the polymer in an amount of more than 0.01% but less than 1.0% by weight.

4,028,484

ALFIN POLYMERIZED RUBBER

Avery A. Morton, 182 Standish Road, Watertown, Mass. 02172, and Edward J. Lanpher, Rte. 111, E. Hampstead, Hampstead, N.H. 03826

Division of Ser. No. 193,742, Oct. 29, 1971, abandoned, which is a continuation-in-part of Ser. No. 862,681, Oct. 1, 1969, abandoned. This application Sept. 18, 1975, Ser. No. 614,540

Int. Cl.² C08F *136/06, 236/06*

U.S. Cl. 526—335 **1 Claim**

1. An alfin catalyzed rubber, selected from the group consisting of butadiene homopolymer and butadiene-styrene copolymer, of DSV greater than 9 and which compounds as soft rubber on a rubber mill after no more than about 15 minutes of mixing in the presence of no more than about 15 phr processing oil added on the mill, and being dischargeable from the mill at a temperature of no more than about 145° C said rubber having been made by polymerization in a closed reaction chamber in which the internal pressure during reaction corresponds to a vapor/liquid ratio of less than about 0.2.

4,028,485

NON-AQUEOUS REMOVAL OF SOLUBLE HYDROGENATION CATALYST

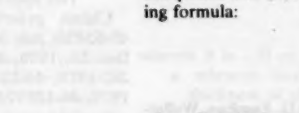
Anthony Poloso, Ridgefield, and James Gordon Murray, East Brunswick, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 29, 1976, Ser. No. 653,413

Int. Cl.² C08F *6/08, 8/04*

U.S. Cl. 528—486 **10 Claims**

1. A process for the removal of hydrogenation catalyst residue, wherein said hydrogenation catalyst was formed by mixing (a) a C_1–C_8 alkylaluminum or a C_1–C_8 alkyllithium compound and (b) an organonickel compound of the following formula:



where R is hydrogen or C_1–C_{12} alkyl or cycloalkyl, from a solution containing said hydrogenation catalyst and from about 1 to 50 wt. % of a hydrogenated olefinic polymer in a hydrocarbon solvent, said process comprising contacting said solution with a non-aqueous organic acid followed by neutralization with anhydrous base and filtration of said solution, thereby removing said hydrogenation catalyst residue.

4,028,486

ALPHA-METHYL-p-BROMO-STYRENE AND METHOD OF PREPARATION

George Jalics, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 475,711, June 3, 1974, Pat. No. 3,959,398. This application May 7, 1976, Ser. No. 684,426

Int. Cl.² C08F *12/16, 112/16, 30/02, 30/04*

U.S. Cl. 526—293 **4 Claims**

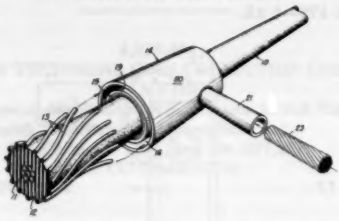
1. A copolymer of α-methyl-p-bromo-styrene and a vinyl polymerizable double bond monomer prepared by free radical addition solvent or emulsion copolymerizing a mixture of about 5 to about 20 weight percent α-methyl-p-bromo-styrene and, correspondingly, about 95 to about 80 weight percent vinyl polymerizable double bond monomer, where said double bond monomer is selected from at least one of dienes selected from 1,3-butadiene, isoprene, dimethyl butadiene and piperylene; monoolefins selected from ethylene, propylene and isobutylene; vinyl aromatic compounds selected from styrene, chlorostyrene, vinyl toluene, α-methyl styrene and divinyl benzene; monobasic acid esters selected from alkyl (C_1 to C_{10}) and alkoxy (C_1-C_4) acrylates and methacrylates; dibasic acid esters selected from maleate, fumarate and itaconates; vinyl cyanides selected from acrylonitrile and methacrylonitrile; vinyl chloride, vinylidene chloride; methyl vinyl ether; vinyl esters selected from vinyl acetate and esters of C_8-C_{10} acids; vinyl phosphonates; organophosphates selected from mono-, di- and triallyl phosphates; vinyl silanes; antimony fumarate.

4,028,487

CABLE TERMINATOR AND GROUNDING UNIT

William B. McLean, 62 Pine Valley, and Edward P. McLean, Box 626, both of Moultrie, Ga. 31768

Filed June 21, 1976, Ser. No. 698,053
Int. Cl.² H02G 15/02; H01R 5/10
U.S. Cl. 174—78 4 Claims



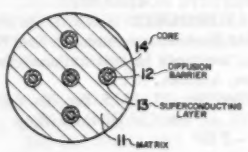
1. A terminator and grounding unit for a cable having a central insulated conductor and an external concentric bare neutral conductor, said unit comprising a deformable metal sleeve to receive said insulated conductor and having an annular side wall chamber formed in one end thereof and terminating deeply within the sleeve for receiving said concentric neutral conductor, whereby the sleeve may then be externally pinched to lock the concentric neutral conductor firmly in said chamber, and a side radially extending deformable metal tube on said sleeve adapted to receive an extrinsic ground conductor and to be pinched thereon to lock the ground conductor securely within said tube.

4,028,488

SUPERCONDUCTORS

Ian Leitch McDougall, Aldridge, England, assignor to Imperial Metal Industries (Kynoch) Limited, Birmingham, England

Filed Jan. 16, 1975, Ser. No. 541,648
Claims priority, application United Kingdom, Jan. 28, 1974, 3830/74
The portion of the term of this patent subsequent to Apr. 8, 1992, has been disclaimed.
Int. Cl.² H01B 12/00
U.S. Cl. 174—128 S 10 Claims



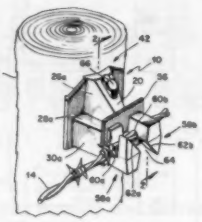
1. A composite superconductor assembly comprising a plurality of filaments of one component of a superconductive intermetallic compound embedded in a matrix material of a material which is non-superconductive at 5° K, there being a layer of the superconductive compound on the filaments, characterised in that the filaments have a diameter in the range 0.0005 to 0.0020 cm, and the layer of superconductive compound has a thickness in the range 0.00005 to 0.0002 cm and the interfilament distance is less than the diameter of the filaments.

4,028,489

PLASTIC NAIL-ON ELECTRIC FENCE INSULATOR

Albert T. Berg, Jr., and Howard Langlie, both of Ellendale, Minn. 56026

Filed Dec. 12, 1975, Ser. No. 640,029
Int. Cl.² H01B 17/24; A01K 3/00
U.S. Cl. 174—166 R 3 Claims



1. An all plastic nail-on electric fence insulator for attachment to wooden posts by means of a single nail comprising a body having a generally hollow interior, said body including a first angled panel inclining upwardly and rearwardly and second and third side panels extending downwardly and rearwardly from said first panel, means at the front of said body for holding an electric fence wire, and means at the rear of said body including a central panel extending between the rear edges of said second and third panels and wing panels extending laterally from said central panel, said rear means also including a first pair of rearwardly extending vertically disposed ribs at the junctures of said central panel with said wing panels and a second pair of rearwardly extending vertically disposed ribs at the free vertical edges of said wing panels, the angled first panel of said body having a nail hole therein so that a nail inserted into said hole can be driven into the post at an angle generally perpendicular to said angled first panel, a raised boss on said angled first panel, said nail hole extending through said boss and first panel, said central panel also having a hole therein at an elevation lower than that of the hole in said angled first panel, said body further including fourth and fifth panels extending laterally from the lower edges of said second and third panels and sixth and seventh panels extending downwardly from the outer edges of said fourth and fifth panels, said first, second, third, fourth, fifth, sixth and seventh panels, together with the back side of said front means and the central and wing panels of said rear means, forming said generally hollow interior, and reinforcing walls converging from the forward ends of said sixth and seventh panels rearwardly to said rear central panel, said reinforcing walls connecting with said central panel generally in forward alignment with said first-mentioned ribs.

4,028,490

MSK DIGITAL DATA SYNCHRONIZATION DETECTOR

Marvin Aaron Epstein, Monsey, N.Y., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Nov. 14, 1975, Ser. No. 632,044
Int. Cl.² H04L 17/16, 7/00
U.S. Cl. 178—88 9 Claims

1. A minimum shift keying (MSK) digital data synchronization detector for a digital data transmission system transmitting Baudot code characters each having start and stop bits in the form of a MSK digital data signal having a stop-start triangle corresponding to adjacent stop and start bits of two adjacent Baudot characters comprising:

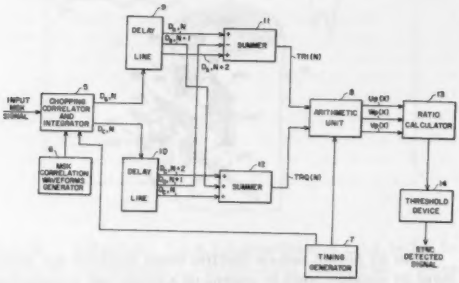
an input for said MSK digital data signal;

first means coupled to said input to produce first and second correlation signals;

second means coupled to said first means, said second means being responsive to said first and second correla-

tion signals to produce inphase and quadrature triangle signals;

third means coupled to said second means, said third means being responsive to said inphase and quadrature triangle signals to calculate many time and phase conditions of said MSK digital data signal at one time to produce third, fourth and fifth correlation signals as a function of assumed bit times; and



fourth means coupled to said third means, said fourth means being responsive to said third, fourth and fifth correlation signals to produce a ratio signal proportional to a ratio of a minimum magnitude squared to a maximum magnitude squared for all carrier phase angles for each of said assumed bit times and to produce a synchronization detected signal when said ratio signal value is less than a given amplitude threshold.

4,028,491

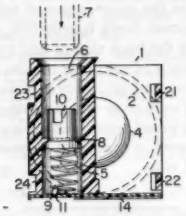
TRANSDUCER SWITCHING SYSTEM

Charles B. Huntress, Orange, and Henry Gabrielian, Newport Beach, both of Calif., assignors to Electronic Engineering Company of California, Santa Ana, Calif.

Filed Apr. 2, 1976, Ser. No. 673,182

Int. Cl.² H04R *1/00*

U.S. Cl. 179—1 SW **10 Claims**



1. A transducer switching system comprising;

a. an electro-acoustic transducer (3) having an enclosure (1) with an acoustic plug, (10)

b. an electrical resistive element (18),

c. an acoustic-use connector (7),

d. resilient electrically conductive means (9) having a small central part away from said acoustic-use connector, and deformable upon the insertion of said acoustic-use connector into said enclosure, to thereby move said acoustic plug, and

e. circuit means to conduct (16,17), connecting said transducer and said resistive element having electrical contact members (12, 15) adjacent to said resilient electrically conductive means,

whereby deformation of said resilient electrically conductive means by the insertion of said acoustic-use connector electrically shorts said resistive element from the circuit.

4,028,492

SPEECH AID APPARATUS FOR LARYNGECTOMEES

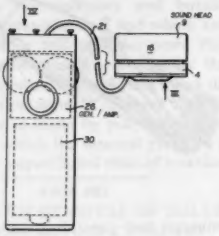
Helmut Sickel, deceased, late of Overath, Germany (by Liesbet Sickel, administrator), assignor to Dr. Kuhn & Co. GmbH, Cologne (Merheim), Germany

Filed Feb. 18, 1976, Ser. No. 659,052

Claims priority, application Germany, Feb. 22, 1975, 2507704

Int. Cl.² A61F *1/20;* **H04R** *9/06*

U.S. Cl. 179—1 AL **14 Claims**



1. Speech aid apparatus for laryngectomees, comprising a sound head consisting of a clamped hard diaphragm capable of being set in vibration by a plunger, a driver in the form of a vibration coil connected with the plunger and associated field-wise with a magnet assembly having a permanent magnet, a soft diaphragm connected to the plunger and a generator-amplifier section connected electrically to the sound head for the production of periodic current pulses for the vibration coil, wherein (a) the permanent magnet of the magnet assembly consists of a permanent magnetic material designated by the formula

$$RECo_5$$

wherein

RE represents one of the rare earth elements

Y, La, Ce, Pr, Nd, Sm or mixtures thereof, and (b) on at least one of the sound head and the generator-amplifier section there is provided a rapidly releasable device for the mechanical joining of the sound head and generator-amplifier, as well as a means for maintaining the electrical connection between the sound head and generator-amplifier section when the mechanical coupling is released and the sound head is spatially removed from the generator-amplifier section.

4,028,493

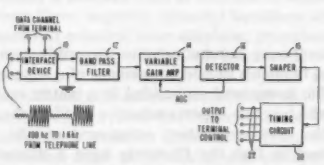
CALL PROGRESS SIGNAL DETECTOR

Andrew Ernest Brennemann, and Suk Suet Soo, both of Ossining, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,213

Int. Cl.² H04M *11/06*

U.S. Cl. 179—2 DP **10 Claims**



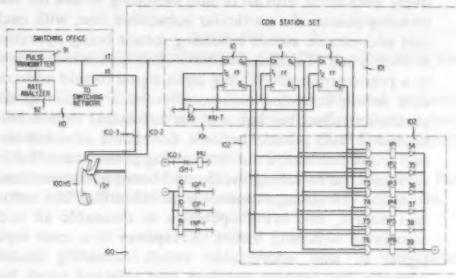
1. A system for analyzing audio telephone call progress signals including means for coupling the audio signal on the telephone system to said analyzing means,

means for minimizing transient signal effects present in received signals, and normalizing the signal magnitudes,
detector means for removing the AC component from said normalized signal,
means for detecting the cadence of said pulses and,
means responsive to said cadence detector for indicating which one of a particular call progress signal is present on the telephone line.

4,028,494
ESCROW TELEPHONE COIN COLLECTION CIRCUIT AND METHOD

Alfred Zarouni, Middletown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 17, 1976, Ser. No. 687,291
Int. Cl.² H04M *17/00*
U.S. Cl. 179—6.3 R **13 Claims**



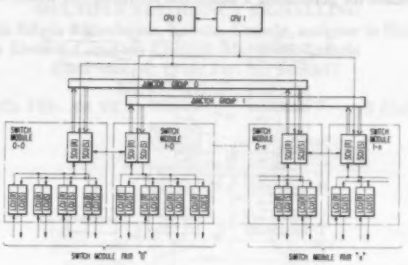
1. A pay telephone station set arrangement comprising:
means for controlling the storage of one or more deposited coins to establish a variable customer credit balance in accordance with the number and denomination of said deposited coins,
means at said set operative at the inception of a call for receiving rate indicating signals,
adjustable circuit means controlled by said receiving means for generating credit reduction signals throughout said cell at a frequency corresponding to said rate indicating signals, and
logic circuit means for coupling said credit reduction signals to said controlling means to decrement said customer credit balance as said call progresses.

4,028,495
TIME DIVISION COMMUNICATION SYSTEM ADAPTED TO STRUCTURAL EXPANSION

Hiroshi Funamo; Toshiro Kunihiro, and Masaaki Mural, all of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Dec. 29, 1975, Ser. No. 645,069
Claims priority, application Japan, Dec. 30, 1974, 50-1642
Int. Cl.² H04M *3/00*
U.S. Cl. 179—15 AT **3 Claims**

1. A time division communication system adapted to structural and capacity expansion, comprising: $2n$ switch modules (n is a positive integer) each composed of m line control units (m is a positive integer) for accommodating m lines and a time division switch control unit capable of controlling $2m$ line control units; said switch modules being connected as n switch module pairs each composed of two switch modules with the switch modules of each said switch module pair being provided with cross connections for enabling the respective time division switch control units to be switched over and cross connected for enabling the respective switch modules to mutually send and receive time-division multiplexed information; and the input and output terminals of the corresponding time division switch control units of the respective switch module pairs being interconnected so that the respective ones of said

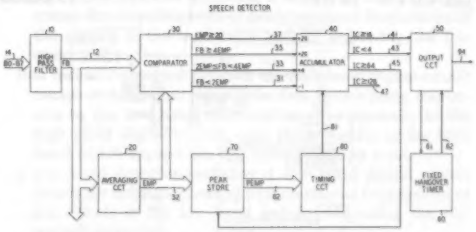


switch module pairs may mutually send and receive said time-division multiplexed information.

4,028,496
DIGITAL SPEECH DETECTOR

Robert Ernest LaMarche, Atlantic Highlands; Carl Jerome May, Jr., Holmdel, and Timothy James Zebo, Freehold, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 17, 1976, Ser. No. 715,121
Int. Cl.² H04J *6/00*
U.S. Cl. 179—15 AS **17 Claims**



1. A speech detector, means for receiving input signal samples, means for generating a representation of the average magnitude of said samples, means for comparing each said sample with said representation and for providing an output signal corresponding to the difference therebetween, and means for accumulating said output signals, said accumulating means generating different control signals corresponding to different predetermined levels of said accumulated output signals.

4,028,497
ACQUISITION TECHNIQUE FOR TIME DIVISION MULTIPLE ACCESS COMMUNICATION SYSTEM

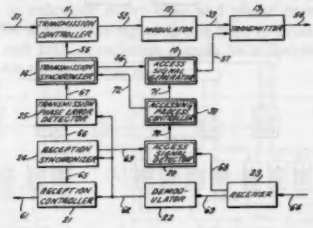
Akio Saburi, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Apr. 1, 1976, Ser. No. 672,797
Claims priority, application Japan, Apr. 4, 1975, 50-41437
Int. Cl.² H04J *3/06*
U.S. Cl. 179—15 BS **17 Claims**

1. Apparatus for initially accessing a relay station in a time division multiple access (TDMA) communication system in which a plurality of transmitting-receiving stations communicate with each other through the relay station and in which a transmitting-receiving station wanting to enter into communication transmits an access signal to the relay station and, receiving the access signal as relayed back therefrom, determines the position of the access signal within the time frame of the TDMA communication system so that information signals from the transmitting-receiving station may be inserted in the time slot assigned thereto for time division channel connec-

tion, said apparatus being characterized in that the transmitting-receiving station is provided with:

means for generating a signal the frequency of which varies



cyclically in periods each being related to those of the time frame of the TDMA communication system and transmitting such signal as an access signal to the relay station.

4,028,498

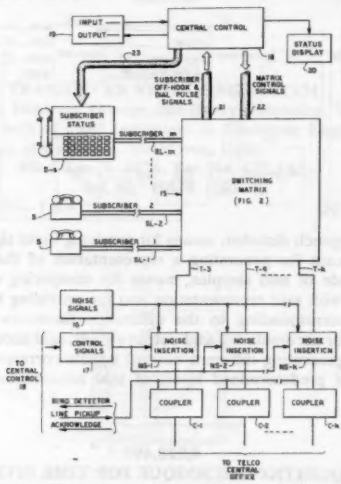
PRIVATE AUTOMATIC BRANCH EXCHANGE SYSTEM AND APPARATUS

Joseph H. Mehaffey, Atlanta; Edgar C. Mills, Marietta, and J. Harold Ivester, Smyrna, all of Ga., assignors to Solid State Systems, Inc., Marietta, Ga.

Filed Oct. 7, 1974, Ser. No. 512,675

Int. Cl.[2] H04Q *3/42*

U.S. Cl. 179—18 GE **15 Claims**



1. Apparatus for selectively coupling a telephone central office circuit to subscriber equipment, comprising:

first solid state means having a control circuit which is operatively coupled to said central office circuit and responsive to a ringing signal on said central office circuit to provide a signal on a ring detection circuit which is electrically isolated from said central office circuit;

switch means connected to said central office circuit and selectively operative to complete a circuit interconnection between the central office circuit and a subscriber circuit;

second solid state means having a control circuit which can receive a line pickup signal which is electrically isolated from said central office circuit and which is operative in response to said line pickup signal to control said switch means to complete said circuit; and

third solid state means having a control circuit which is connected to be responsive to current flow through said central office circuit and through said switch means to provide an output signal on a line pickup acknowledge circuit which is electrically isolated from said central office circuit.

6. An addressable N × M switching matrix, comprising:

a first number M of subscriber lines in parallel matrix array, each subscriber line comprising at least a pair of conductors for connection with a separate subscriber station;

a second number N of trunk lines in parallel matrix array with each other and in crossing relation with each of said subscriber lines, each of said trunk lines comprising at least a pair of conductors;

switching means separately and independently associated with each crossing point of subscriber lines and trunk lines in said matrix, each said switching means being selectively operative to connect a subscriber line to the trunk line at such crossing point; and

a number M of addressable switch actuating means;

one of said addressable switch actuating means being operatively associated with all of said switching means for said crossing points of a particular subscriber line, with each said addressable switch actuating means being operative to enable any of said associated switch means in response to a predetermined enabling input signal to said addressable switch actuating means, whereby a portion of the particular subscriber line and the subscriber station connected to said portion become connected to a selected said trunk line at the matrix crossing point controlled by said selected switching means and become disconnected from the remaining extent of such subscriber line across said matrix, and being operative to disenable all such associated switching means in response to a reset input signal to said addressable switch actuating means, whereby any existing previous said selected trunk line connection is terminated and said subscriber line uninterruptedly crosses said trunk lines without connection thereto.

4,028,499

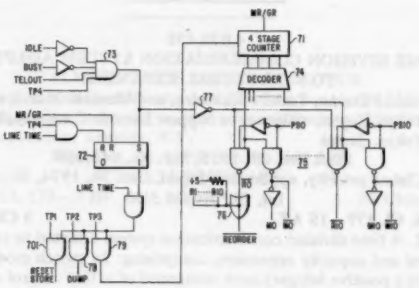
UNIVERSAL/ASSIGNED NIGHT ANSWERING SYSTEM FOR EPABX

Norman Hovagimyan, Cherry Hill; Anthony Domenic Iadicola, Cinnaminson, and William Paul Ianuzzi, Cherry Hill, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Nov. 28, 1975, Ser. No. 636,094

Int. Cl.[2] H04M *3/58*

U.S. Cl. 179—18 BD **4 Claims**



1. In a telephone switching system having a plurality of incoming lines to be selectively coupled to selected ones of a plurality of telephone stations, said telephone stations having means for selectively producing dial signals, annunciator means responsive to a ringing signal on one of said plurality of incoming lines for indicating an active incoming line, register means responsive to an off-hook signal from a telephone station for producing answering mode signals, and means

responsive to said register means for permitting interstation calls to be initiated between telephone stations not coupled to an incoming line, the improvement comprising:

coupling means responsive to said answering mode signals for directly coupling said off-hook telephone station to said active incoming line, said coupling means comprising

counter means for producing in sequence m combinations of signals, where m is an integer equal to or greater than the number of incoming lines;

decoding means responsive to said counter means for producing one-out-of-m signals;

gating means responsive to said decoding means and to the ringing signal on said one of said plurality of incoming lines for producing an equipment locator signal to a switching matrix; and

terminator means responsive to an equipment locator signal from said gating means for disabling said counter means.

4,028,500

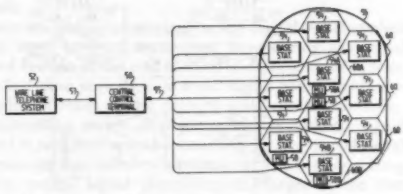
MOBILE UNIT SUPERVISORY CONTROL SEQUENCER AND METHOD

George F. McClure, Winter Park; John Richard Endicott, Maitland; Lionel D. Freeman; Marion L. Cunningham, both of Orlando, and Joel D. Wells, Orlando, all of Fla., assignors to Martin Marietta Corporation, Orlando, Fla.

Continuation-in-part of Ser. No. 360,560, May 15, 1973, Pat. No. 3,898,390. This application Apr. 21, 1975, Ser. No. 569,677

Int. Cl.² H04M *7/04*

U.S. Cl. 179—41 A **39 Claims**



1. A mobile telephone unit comprising:

first storing means for storing aan address signal representing a telephone system subscriber;

means for displaying the stored address signal;

a manually depressable call switch for generating a call initiation signal;

second stroring means for storing said generated call initiation signal;

means for selecting one of a predetermined plurality of communication channels for broadcast of a call-up signal;

means for generating a call enabling signal in response to the selection of said one communication channel;

means for broadcasting a call-up signal including said stored address signal over the selected one of the plurality of communication channels in response to the simultaneous presence of both said call initiation signal generated through the manual depression of said call switch and said call enabling signal generated in response to the selection of said one channel;

means for receiving a response signal acknowledging said call-up signal for automatically indicating receipt of said response signal; and

means including a handset removably cooperable with a hook-switch independent of said manually depressable call switch for establishing two-way voice communication over a two-way communication channel in response to removal of said handset from cooperating relationship with said hook-switch, whereby a call may be initiated and acknowledged without removing the handset from the hook-switch.

4,028,501

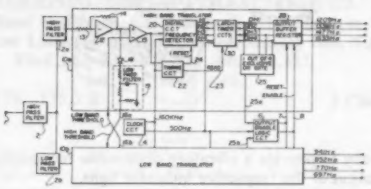
METHOD AND APPARATUS FOR TRANSLATING MULTIPLE FREQUENCY SIGNALLING

Dennis Edwin Rittenhouse, Kanata, Canada, assignor to Northern Electric Company Limited, Montreal, Canada

Filed Mar. 4, 1976, Ser. No. 663,687

Int. Cl.² H04M *1/50*

U.S. Cl. 179—84 VF **5 Claims**



1. A multiple frequency signalling receiver, for translating predetermined combinations of tone signals to derive signalling information therefrom, the receiver comprising:

input means for receiving voice frequency signals;

filter means, connected to the input means, for filtering the received signals into separate high and low bands;

means, connected to the filter means, for generating high band and low band threshold levels in response to the amplitudes of signals in the high and low bands respectively;

a high band detector including a high band digital circuit means for detecting ones of predetermined frequencies of the signals in the high band and for indicating the frequency detected;

first means connected between the high band digital circuit means and the filter means, the first means being responsive to the low band threshold level to transmit, to the high band digital circuit, only those signals in the high band which exceed the low band threshold level;

a low band detector including a low band digital circuit means for detecting ones of predetermined frequencies of the signals in the low band and for indicating the frequency detected;

second means connected between the low band digital circuit means and the filter means, the second means being responsive to the high band threshold level to transmit, to the low band digital circuit, only those signals in the low band which exceed the high band threshold level;

output means for indicating the frequencies detected by the detectors in response to a substantially simultaneous and constant indication of frequency detection from both detectors extending over a predetermined period of time.

4,028,502

APPARATUS FOR ADAPTING MULTI-LINE TELEPHONE INSTRUMENT FOR USE BY THE BLIND

Larry S. Moricca, Churubusco, and Gregory A. Zaker, Fort Wayne, both of Ind., assignors to Inventive Industries, Inc., Houston, Tex.

Filed Feb. 13, 1976, Ser. No. 657,719

Int. Cl.² H04M *1/72*

U.S. Cl. 179—99 **15 Claims**

11. Apparatus for adapting a multi-line telephone instrument having a plurality of line-selector pushbuttons and associated indicator lights for use by the blind comprising, for each said line-selector pushbutton, an auxiliary pushbutton, means for mounting said auxiliary pushbutton in alignment with the line-selector pushbutton whereby manual depression of said auxiliary pushbutton actuates said line-selector pushbutton, light-sensitive means for sensing illumination of the respective indicator light, means for generating an alternating current

signal in response to said light-sensitive means, and means for vibrating said auxiliary pushbutton in response to said signal

thereby to provide a vibratory discernible recognition of illumination of the respective indicator light.

4,028,503

ELECTROMAGNETIC SOUND GENERATOR

Hakon Rosenkilde, Brincks Have 5, 2630 Taastrup, Denmark

Filed Aug. 4, 1975, Ser. No. 601,284

Claims priority, application Denmark, Aug. 7, 1974, 4189/74

Int. Cl.² G10K *9/14*

U.S. Cl. 179—115 R **8 Claims**

1. An electromagnetic sound generator comprising a frame, a membrane with the periphery thereof fixed to the frame and having an axis, an electromagnetic actuation means mounted on the frame for applying a cyclical force to the central portion of the membrane relative to its periphery and bending one portion of the membrane in a direction towards the elctromagnetic circuit and the other portion in a direction away from same, thereby providing a sound generator in which the sound intensity is increased by the interaction between the bending of the membrane and translation of the central portion of the membrane.

4,028,504

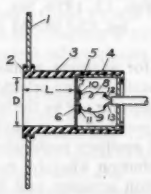
ACOUSTIC AMPLIFIER COMBINED WITH TRANSDUCER SHOCK MOUNT

Frank Massa, Cohasset, Mass., assignor to Fred M. Dellorfano, Jr., and Donald P. Massa, Trustees of The Stoneleigh Trust u/d/t, Cohasset, Mass.

Filed Nov. 12, 1975, Ser. No. 630,983

Int. Cl.² H04R *1/28*

U.S. Cl. 179—146 R **8 Claims**



1. In combination in a sound detection system, an electroacoustic transducer, an acoustic amplifier comprising a tubular member, a first mounting means associated with said tubular member for holding said transducer at one end of said tubular member, said transducer and said first mounting means characterized in that said mounted transducer forms a closure at said one end of said tubular member, and further characterized in that said closure presents a plane surface at right angles to the axis of said tubular member and still further characterized in that said plane surface extends to the inner wall surface of said tubular member, and a second mounting means associated with said tubular member for attaching said tubular member to a support structure.

4,028,505

NEGATIVE IMPEDANCE REPEATER FOR TELEPHONE LINES

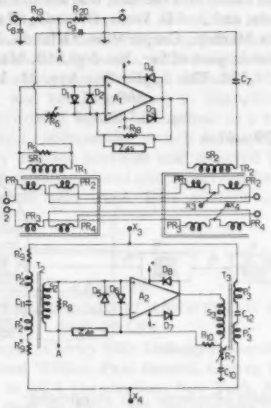
Lorenzo Fassino, Via Piedicavallo 32, Turin, Italy

Continuation-in-part of Ser. No. 441,369, Feb. 11, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 619,905

Claims priority, application Italy, Mar. 12, 1973, 67674/73

Int. Cl.² H04B *3/36, 3/16*

U.S. Cl. 179—170 G **3 Claims**



1. A negative impedance repeater for amplification of loaded or non-loaded telephone lines operating at voice frequency comprising:

a first open circuit stable one-port network, the terminals of which are the input terminals of a negative impedance converter, the output of which is loaded by a preset passive impedance network, chosen in relation to the characteristic impedances of the line section to be amplified;

a second short circuit stable one-port network, the terminals of which are the input terminals of a negative impedance converter, the output of which is loaded by a preset passive impedance network, chosen in relation to the characteristic impedances of the line section to be amplified;

adjusting means in each of said converters, and external to said impedance networks, for adjusting the feedback and consequently the conversion ratio;

said adjusting means being independent from each other and being manually varied on the basis of predetermined conversion ratio curves such that:

in the case of loaded lines, the product of the two conversion ratios remains constant over the entire variation range; to provide a gain adjustment which does not affect the repeater impedance and

in the case of non-loaded lines, the conversion ratio of the converter included with the short circuit stable network increases quicker than the conversion ratio of the converter included within the open circuit stable net-

work decreases, to provide a gain adjustment which increases more quickly at the high frequencies than at the low frequencies of the transmitted band, so that an equalization, necessary for this type of lines is introduced, and, coupling means for coupling said converters to the line to be amplified.

4,028,506

MAXIMUM VALUE TRACING CIRCUIT FOR DIGITIZED VOICE SIGNALS

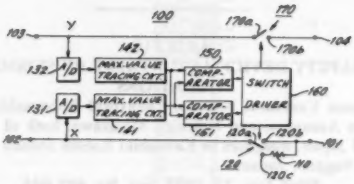
Takashi Araseki, and Kazuo Ochiai, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Dec. 9, 1974, Ser. No. 530,620

Claims priority, application Japan, Dec. 12, 1973, 48-141059; Mar. 25, 1974, 49-33800

Int. Cl.² H04B 3/22

U.S. Cl. 179—170.2 **3 Claims**



3. A maximum value tracing circuit for extracting a peak value of an input signal of varying value, said input signal being periodically digitized, said tracing circuit comprising:

primary input means for receiving said periodically digitized signal;

first memory means for storing the last digital signal applied to its input terminal means and for clearing any signal stored therein at the end of each of a plurality of successive first time periods, said input signal being digitized a plurality of times during each of said first time periods;

first comparing means for comparing the digital signal stored in said first memory means to the last digital signal received by said primary input means and for generating a first control signal identifying the larger of the two signals last compared by said first comparing means;

first switch means responsive to said first control signal for applying the larger of the two signals last compared by said first comparing means to said input terminal means of said first memory means;

second memory means for storing the last digital signal applied to its input terminal means for clearing any signal stored therein at the end of each of a plurality of successive second time periods, each of said second time periods being of the same duration as each of said first time periods, the end of each of said second time periods being offset with respect to the end of each of said first time periods;

second comparing means for comparing the digital signal stored in said second memory means to the last digital signal received by said primary input means and for generating a second control signal identifying the larger of the two signals last compared by said second comparing means; output means; second switch means responsive to said second control signal for applying the larger of the two signals last compared by said second comparing means to said input terminal means of said second memory means;

third comparing means for comparing the digital signals resulting from the last comparison operations of said first and said second comparing means and appearing at the outputs of said first and said switch means and for generating a third control signal identifying the larger of the two signals last compared by said third comparing means; and third switch means responsive to said third control signal for applying the larger of the two signals last compared by said third comparing means to said output means.

4,028,507

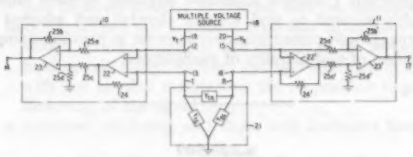
APPARATUS FOR APPLYING PARTICULAR VOLTAGES TO THREE-TERMINAL CIRCUITS AND MEASURING RESULTING CURRENT FLOWS FOR THE PURPOSE OF DETERMINING CIRCUIT CHARACTERISTICS

Richard Scott Hoppough, Greensboro, N.C., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 28, 1976, Ser. No. 700,333

Int. Cl.² H04B 3/46

U.S. Cl. 179—175.3 R **2 Claims**



1. Apparatus for forcing the terminals of a circuit to particular potential levels and for producing output voltages relating to currents flowing in said terminals, which output voltages may be utilized in determining the characteristics of said circuit, said apparatus comprising

first and second means each having a first input terminal for receiving an input voltage, a second input terminal for connection to one of said circuit terminals and, furthermore, which is forced to substantially the same potential level as said input voltage, and an output terminal for producing an output voltage linearly related to current through said second input terminal, and

third means operable for applying at least one combination of two voltages to said first input terminals, respectively, where said combination may comprise voltages of finite value, voltages of zero value or a voltage of finite value and a voltage of zero value.

4,028,508

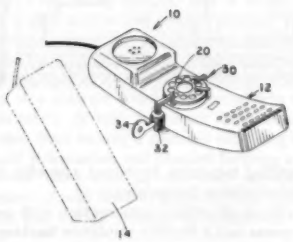
TELEPHONE LOCK

James N. Hall, 2851 Barker Ave., Bronx, N.Y. 10467

Filed June 2, 1976, Ser. No. 692,134

Int. Cl.² H04M 1/66

U.S. Cl. 179—189 D **6 Claims**



1. A telephone locking device for preventing the unauthorized use of a telephone of the type having a handset and a base portion and wherein a rotary calling dial is contained on the inside surface of the handset, said device comprising:

a generally U-shaped fixed engaging element adapted to engage said rotary dial;

a locking element attached to said fixed engaging element by means of an encircling strap positioned about the outer surface of said handset; and

a generally U-shaped adjustable engaging element adjustably secured to said locking element and adapted to engage said rotary dial in order to prevent rotation of said rotary dial.

4. A telephone locking device for preventing the unauthorized use of a telephone of the type having a handset and a base portion and wherein a plurality of pushbutton calling elements are contained on the inside surface of the handset, said device comprising:

a protective cover for said pushbutton calling elements;

a generally U-shaped fixed engaging element adapted to engage said cover;

a locking element attached to said fixed engaging element by means of an encircling strap positioned about the outer surface of said handset; and

a generally U-shaped adjustable engaging element adjustably secured to said locking element and adapted to engage said protective cover in order to prevent manipulation of said plurality of pushbuttons.

4,028,509

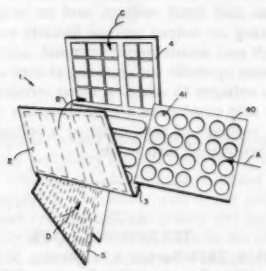
SIMPLIFIED TABULATOR KEYBOARD ASSEMBLY FOR USE IN WATCH/CALCULATOR HAVING TRANSPARENT FOLDABLE FLEXIBLE PRINTED CIRCUIT BOARD WITH CONTACTS AND ACTUATOR INDICIA

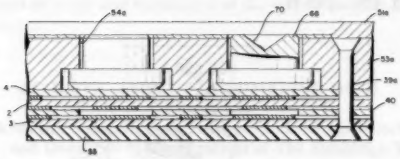
Rudolf F. Zurcher, Newport Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Aug. 29, 1975, Ser. No. 608,852

Int. Cl.² G04B *47/06, 19/30;* **H01H** *9/00, 13/02*

U.S. Cl. 200—5 A **4 Claims**





1. As simplified tabulator keyboard assembly for use in a digital watch/calculator comprising:

a flexible circuit of unitary construction with metallic conductive areas and a flexible insulative backing, said flexible circuit comprising:

a lower array of contacts, each of said contacts make electrical connection to a contact terminator provided as part of said flexible circuit;

an upper array of deformable contacts, each of said deformable contacts making electrical connection to a contact terminator provided as part of said flexible circuit and being provided with a plurality of conductive tabs, one for each of said contacts in said lower array;

a flexible conductor portion for making electrical connection to at least the electronics module of said watch calculator;

said lower array and said upper array are separated by an insulative spacer having a plurality of holes, one for the intersection of each contact in said lower array with each contact of said upper array;

said upper array is folded over said lower array such that the metallic conductive portions thereof directly face the respective metallic conductive portions of said lower array but are separated thereform by said insulative spacer; and

an indicia array having a plurality of numeric and other symbols defined by a metallized region, one of such symbols being provided for each of said holes in said insulative spacer; and

said indicia array is folded over said upper array such that the metallized portions of said indicia array are in contact with the insulative backing of said upper array.

4,028,510

SAFETY DEVICE ACTUATABLE BY SEISMIC VIBRATIONS

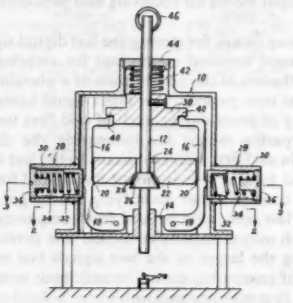
Yoshitomo Yamaura, Nagano; Takayoshi Kobayashi, Tokyo; Akira Asanuma, and Kuichiro Miyazawa, both of Nagano, all of Japan, assignors to Kabushiki Kaisha Shinko Seisakusho, Nagano, Japan

Filed Aug. 22, 1975, Ser. No. 607,045

Claims priority, application Japan, Aug. 24, 1974, 49-97272; Oct. 25, 1974, 49-123222

Int. Cl.² H01H *35/14*

U.S. Cl. 200—61.45 R **5 Claims**



1. An apparatus actuatable by seismic vibrations comprising:

a longitudinal housing formed with a central bore and mountable on a support unit;

a rod axially penetrating said central bore and movable from an upper position to a lower position for selectively opening and closing a switch by its vertical movement;

first biasing means for biasing the rod downwardly;

a keeper member secured to an upper portion of said rod in said housing;

a plurality of stays disposed around said rod for holding said rod at the upper position against the action of said biasing means, and stays normally engaging said keeper member;

second biasing means for biasing the stays in the direction of urging engagement of each of said stays with the keeper member;

a weight support member attached to a lower portion of said rod in the housing; and

a first weight having a central portion penetrable by said rod, having a lower peripheral edge supportable at the inside thereof by each of said stays, said first weight being positioned to face an upper portion of said weight support member for pushing each of said stays outwardly during vertical and horizontal vibrations of said apparatus for

said rod to move downwardly to the second position upon separating said stays from said keeper member together with a drop of said weight, whereby said weight pressing on said weight support member increases the total mass of the downwardly moving rod.

4,028,511

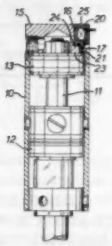
FLUID JACK WITH BUILT-IN PISTON OPERATED SWITCH

Andre Wack, 14 Rue Jules Verne, Sens; Robert Bezicot, 48 Rue Joseph Fouriaux, Antony, and Andre´ Cosset, 5 Rue Claude Lebret, Gournay sur Marine, all of France

Filed June 16, 1975, Ser. No. 587,049

Int. Cl.² H01H *35/38*

U.S. Cl. 200—82 R **5 Claims**



1. The combination of a fluid jack of the type including a cylinder, a piston mounted on a piston rod movable in said cylinder along a path of movement between a retracted and an extended position, and end closure member closing said cylinder at one of its ends and having a recess opening to the exterior of said jack, said piston having an end face opposing said end closure member, a longitudinal passage extending through said end closure member from a transverse bottom wall of said recess to the interior of said cylinder; an electrical switch unit operable in response to movement of said piston to a position adjacent said end closure member, said switch unit being disposed substantially entirely inside said recess and embedded in electrical insulating material, said switch unit having an operating member extending beyond the embedding electrical insulating material, and a combined sealing and motion transmission member formed at least in part of electrical insulating material and in direct sealing contact with the wall of said passage for sealingly separating said switch unit from the interior of said cylinder, said combined sealing and motion transmission member normally projecting into the path of movement of said piston and in operative engagement with said operating member to actuate said switch unit when said piston end face comes into engagement with said sealing and motion transmission member and wherein said electrical insulating material is circumjacent said operating member along a substantial portion of its length.

4,028,512

LIQUID LEVEL ACTUATED ELECTRICAL SWITCH

Theodore E. Fiddler, 1268 Suffield Drive, Birmingham, Mich. 48008

Filed July 25, 1975, Ser. No. 599,132

Int. Cl.² H01H *35/40*

U.S. Cl. 200—84 C **1 Claim**

1. A normally open switch for closing a circuit to produce a signal voltage indicative of a condition, such as the liquid level in a tank, comprising,

a float,

means for movably mounting said float in a tank so that said float rises and falls with the level of the liquid in the tank,

electrical terminals spaced apart and lying adjacent said float connectable to signal circuits,

a bridge member for contacting said terminals to close a circuit between said terminals,

a magnet mounted at one said terminal and said bridge member,

an armature mounted at the other said terminal and said bridge member;

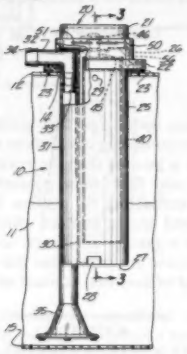
one said magnet and said armature being mounted for movement with said bridge member from a relatively remote position to a relatively proximate position relative to one another;

means connecting said float and said bridge member for moving said bridge member with said float responsive to the level of the liquid in a tank;

said float being capable of moving said bridge member toward said terminals from a relatively remote off position to an on position in contact with one another;

said magnet and said armature upon said terminals and said bridge member engaging one another in the on position, holding said bridge member and said terminals in contact with one another maintaining the on position to prevent flickering of the signal lamp;

a container enclosing said float; said container having at



least one small orifice for communicating liquid from a tank to said container at said float; said container protecting said float against sudden changes in liquid levels in the tank at the float due to outside influences to prevent movement of the float to the on position when the liquid level of the tank is not at the true refill level;

a cap housing said switch parts; said cap being connected to said container enclosing said float; said cap and said container being attachable and removable relative to a tank;

said container having an arcuate longitudinal indentation forming a receiving socket; and a liquid supply tube nested in said socket and held in position therein by the spring-like force of the engagement; said container, cap and tube forming an assembly removably mountable in a hole in the tank as a unit; said supply tube leading to the bottom of a tank on which the assembly is mounted;

said indentation in said container lying adjacent to said float; said float having a channel receiving said indentation; said indentation and channel forming a guide for up and down movement of the float preventing angular movement of said float to maintain said electrical terminals and said bridge member in alignment.

4,028,513

STEEL ARCING CONTACT FOR CIRCUIT BREAKER

Ward E. Laubach, Cherry Hill, N.J., assignor to I-T-E Imperial Corporation, Spring House, Pa.

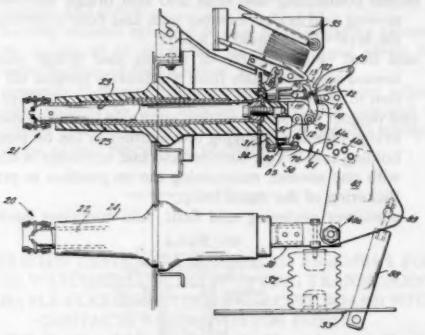
Filed May 8, 1975, Ser. No. 575,717

Int. Cl.² H01H *33/12*

U.S. Cl. 200—144 R **7 Claims**

1. In a high power circuit breaker; a first stationary main terminal and second stationary main terminal, first and second

main contacts movable between an engaged and disengaged position relative to one another and connected to said first and second main terminals, respectively, first and second arcing contacts electrically connected to said first and second main contacts, respectively, and to said first and second main stationary terminals, respectively, and movable between an engaged and disengaged position; said first and second arcing contacts being engaged before and disengaged after said first and second main contacts are engaged and disengaged, respectively; said first main contact having a major body portion

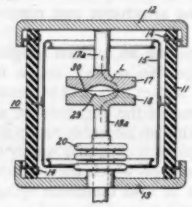


of highly conductive metal; said first arcing contact having a major body portion consisting of a ferrous material and having a resistivity which is greater than the resistivity of said major body portion of said first main contact; said first arcing contact having a contacting tip portion for making engagement to said second arcing contact which is of an alloy of copper which has a greater resistance to erosion under the influence of an electric arc than either the said highly conductive metal material of said first contact or said ferrous material.

4,028,514
HIGH CURRENT VACUUM CIRCUIT INTERRUPTER WITH BERYLLIUM CONTACT

Donald R. Kurtz; Carl C. Popadick, both of West Chester; Joseph C. Sofianek, Broomall, and Joseph L. Talento, Media, all of Pa., assignors to General Electric Company, Philadelphia, Pa.

Filed Dec. 3, 1974, Ser. No. 529,178
Int. Cl.² H01H *33/66, 1/02*
U.S. Cl. 200—144 B **14 Claims**



ABOUT 100X

CAST AND EXTRUDED BERYLLIUM

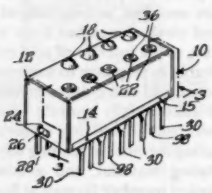
1. A vacuum-type circuit interrupter rated for interrupting currents of 30,000 amperes r.m.s. and higher comprising:

a. a highly evacuated envelope,
b. a pair of separable contacts within said envelope that are relatively movable between engaged and disengaged positions,
c. said contacts having arcing portions between which arcs are formed upon disengagement of said contacts, said arcing portions including arc-initiation regions between which said arcs are initiated upon contact-disengagement,
d. said arcing portions being of a material consisting essentially of beryllium formed from an ingot cast in an inert environment, which ingot has been subject to hot working to produce a microstructure that is characterized by grains much smaller on the average than the average grain size of the as-cast ingot.

4,028,515
SPRING CONTACT SWITCH FOR DUAL IN LINE MULTIPLE SWITCH ASSEMBLY HAVING MOMENTARY ACTUATED LIGHTED INDICATORS

Frank B. Desio, Melrose Park, and Samuel Lee Webb, Lisle, both of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.

Filed Sept. 15, 1975, Ser. No. 613,696
Int. Cl.² H01H *13/32, 1/06*
U.S. Cl. 200—276 **3 Claims**

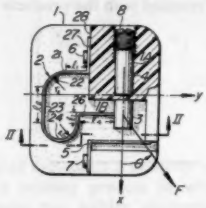


1. An electrical switch mechanism comprising a horizontally disposed base, first and second spaced-apart contact members which extend vertically upward from said base, a wound coil spring, the lower portion of which is supported in a vertical manner by receipt of the upper portion of said first contact member inside the lowermost end coils of said spring so that the lowermost end coils of said spring encircle said upper portion of said first contact member, said coil spring being bent in a smooth arc that prevents buckling of said coil spring during operation of said switch, and a depressible actuating member which has a cam surface thereon which contacts and deflects the upper portion of said spring toward said second contact member to form said smooth arc so that said upper portion of said coil spring directly overlays but does not contact said second contact member when said actuating member is in its undepressed condition and which further deflects said upper portion of said coil spring downwardly into contact with said second contact member with the lowermost end coils of said coil spring continuing to encircle the upper portion of said first contact member when said actuating member is depressed, so that an electrical circuit between said first and second contact members is thereby made and said coil spring acts to return said actuating member to its initial undepressed position following the release of actuation pressure on said actuating member.

4,028,516
ACCELERATION DETECTOR SWITCH HAVING MAGNETIC BIASED CONDUCTIVE OSCILLATING CONTROLLER

Kenzo Hirashima; Harutoshi Tsujimura, both of Yokohama; Akira Hasegawa, Katsuta; Takahiko Tanigami, Mito, and Kenichi Ushiku, Katsuta, all of Japan, assignors to Hitachi, Ltd. and Nissan Motor Co., Ltd., both of, Japan

Filed Jan. 8, 1975, Ser. No. 539,425
Claims priority, application Japan, Jan. 14, 1974, 49-6574
Int. Cl.² H01H *35/14*
U.S. Cl. 200—61.45 M **15 Claims**

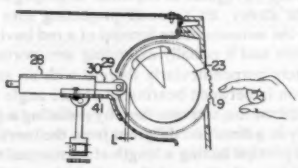


1. An acceleration detector, wherein a magnet and a fixed contact member are mounted on a base mount, and an inertial body serving as a movable contact and located between said magnet and said fixed contact is secured to the free end of a plate-spring, while the other end of said plate-spring is secured to said base mount, whereby when an acceleration of a predetermined magnitude is applied to said inertial body, said inertial body is biased against an attracting force of said magnet to contact said fixed contact member, thereby closing an electric circuit, characterized in that the widthwise direction of said plate-spring is perpendicular to the line extending between the center of said magnet and the center of said fixed contact, and that said plate-spring includes at least a pair of opposing curved portions formed between the fixed end and free end thereof, wherein said pair of curved portions are disposed in facing relationship to one another with the respective centers of curvature of said pair of facing curved portions being located in facing relationship to the same surface of said plate-spring.

4,028,517
MICROWAVE OVEN

Junzo Tanaka, Fujiidera, and Chikao Nakano, Yamatokoriyama, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Feb. 28, 1975, Ser. No. 554,113
Claims priority, application Japan, Mar. 4, 1974, 49-25427
Int. Cl.² H05B *9/06*
U.S. Cl. 219—10.55 B **6 Claims**



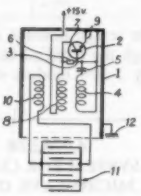
1. In a microwave oven including, an oven body having a heating cavity therein, a door for opening or closing a front opening of said heating cavity, a high frequency wave generating means for radiating high frequency energy into said heating cavity, a timer means for setting a heating time, and a cooking menu selecting means disposed on a front panel of said oven body including a rotatable scale having a plurality of menus printed thereon and a control know coupled to the rotatable scale for selecting one of said menus, the improvement comprising

a high frequency wave output control means for controlling the magnitude of the output of said high frequency wave generating means, said high frequency output control means having a single switch operating rod being linked to a cam of said control knob of said cooking menu selecting means for effecting control of the output of said high frequency wave generating means in conjunction with the selection of a desired cooking menu, thereby generating an optimum high frequency wave output for the selected cooking menu.

4,028,518
DEVICE FOR SUPERFICIALLY HEATING AN ADJACENT BODY

Georges Boudouris, Grenoble; Grégoire Kalopissis, Neuilly-sur-Seine; Jean-Luc Leveque, and Paul Roussopoulos, both of Paris, all of France, assignors to L'Oreal, Paris, France

Filed June 13, 1975, Ser. No. 586,748
Claims priority, application Luxembourg, June 18, 1974, 70345
Int. Cl.² H05B *9/04*
U.S. Cl. 219—10.81 **8 Claims**



1. Device for increasing the superficial temperature of a body such as the skin, which comprises a resonator including an electrically conductive jacket which is substantially closed in the electromagnetic sense of the term, a coil inside said jacket for emitting high frequency electromagnetic energy, coupling means for matching said high frequency energy to the resonant frequency of the resonator, and an applicator circuit connected to conduct the energy produced inside the jacket to an applicator located outside the jacket.

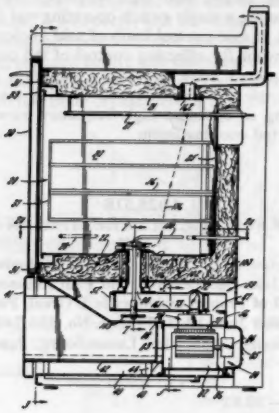
4,028,519
MODULAR POWER SUPPLY AND WAVEGUIDE CONSTRUCTION FOR MICROWAVE OVEN

Raymond Paul De Weese, Kankakee, Ill., and Beverly D. Kumpfer, Salt Lake City, Utah, assignors to Roper Corporation, Kankakee, Ill.

Filed Feb. 26, 1976, Ser. No. 661,564
Int. Cl.² H05B *9/06*
U.S. Cl. 219—10.55 B **18 Claims**

1. In a combined microwave-thermal range the combination comprising a frame having walls defining a rectangular oven cavity and an adjacent space, doors for respectively enclosing the front surfaces of the cavity and the adjacent space, a thermal element in the cavity, the walls of the cavity being insulated, the bottom wall of the oven cavity having an opening, a microwave module including a microwave power supply housing of generally rectangular shape arranged in the adjacent space, a magnetron and blower in the housing, the module including a waveguide of rectangular cross section having one end secured to the top of the housing and having its other end extending cantilever-fashion under the bottom wall of the cavity, the waveguide having an inlet alined with the magnetron and an outlet alined with the opening in the cavity, a hollow, open-ended conductor extending through the opening for coupling the outlet of the waveguide to the cavity, means

for securing the upper end of the hollow conductor to the bottom wall of the cavity and the lower end of the conductor to the waveguide, the hollow conductor being readily disengageable from the waveguide, and the module being disengageably secured in seated position and dimensioned for removal intact through the front surface of the adjacent space for replacement by a new module should servicing become necessary.

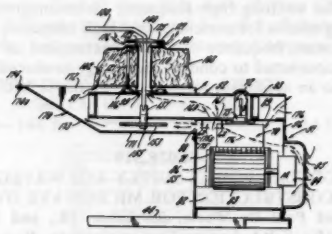


4,028,520

AIR FLOW SYSTEM FOR COMMON CAVITY MICROWAVE OVEN

Sumner H. Torrey, West Lafayette, Ind., assignor to Roper Corporation, Kankakee, Ill.

Filed Feb. 26, 1976, Ser. No. 661,524
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 B **7 Claims**



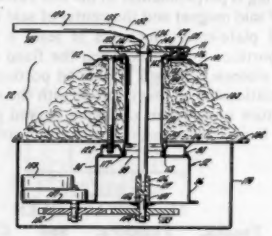
1. In a combined microwave-thermal range, the combination comprising a frame having walls defining a rectangular oven cavity and a lower space, a door enclosing and sealing the front surface of the cavity against passage of air and microwave energy, a thermal element in the cavity, control means for operation of the thermal element at a normal temperature level for food preparation and at a high level for a self-cleaning mode, the walls of the cavity being insulated, the bottom wall of the cavity having an inlet opening, means defining a cavity air vent at the top of the cavity, a microwave power supply including a blower and a magnetron having cooling fins, the blower having a blower inlet for drawing in cooling air and an outlet for supplying such air under slight pressure to the cooling fins, a waveguide having an inlet connected to the magnetron and extending under the bottom wall of the cavity to terminate at an outlet, means for connecting the outlet of the waveguide to the inlet opening of the cavity for conduction of microwave energy into the cavity, means defining air passages of limited cross section for conducting air from the magnetron into the waveguide so that a portion of the pressurized air passes through the waveguide and into the cavity for ventilating the cavity when the magnetron and blower are turned on, the blower inlet being located at a lever below the bottom wall of the cavity so that when the blower and magnetron are turned off and the thermal element is turned on air is thermally convected from the blower inlet through the air passages into the waveguide and into the cavity for exiting through the cavity air vent notwithstanding the auto ignition pressure which exists in the cavity under high temperature self-cleaning conditions, the convention path of the air being sufficiently constricted so that air is convected in the self-cleaning mode at a level below that which is capable of producing an explosive reaction with the products of decomposition.

4,028,521

ANTENNA CONSTRUCTION FOR MICROWAVE OVEN

Frederick K. Uyeda, Attica, and Buddy J. Austin, Lafayette, both of Ind., assignors to Roper Corporation, Kankakee, Ill.

Filed Feb. 26, 1976, Ser. No. 661,543
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 F **16 Claims**

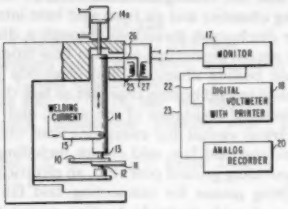


1. In a microwave oven the combination comprising conductive walls and a conductive door defining an enclosed cavity, one of the walls having an opening, a source of microwave energy including a waveguide extending adjacent the said one wall, a hollow open-ended conductor penetrating the wall registering with the opening at one end and in communication with the waveguide at the other to propagate an inertial wave in the cavity, an antenna projecting into the hollow conductor, the antenna being formed of a rod having a straight shank portion and a radially extending arm portion arranged approximately perpendicularly thereto with an angled transitional portion in between bearing an obtuse angle with respect to each of them, the antenna thereby radiating a guided wave in the cavity in a direction different from the inertial wave, the transitional portion having a length at least equal to the radius of the hollow conductor and the radial arm portion having a length of at least that of the transitional portion, a rotatable mount for supporting the shank portion of the antenna substantially centered in the hollow conductor so that the transitional portion is spaced inwardly of the associated wall, and means including a driving motor coupled to the mount for rotating the antenna so that the guided wave is cyclically swept throughout the cavity superimposed upon the field of the inertial wave for improved energy distribution in the cavity and relative freedom from hot spots.

4,028,522
MULTI-MODE STRUCTURAL WELD MONITOR ON A TIME BASE

Russell Alexander Chihoski, and John Charles De Fellippie, both of Littleton, Colo., assignors to Martin Marietta Corporation, Rockville, Md.

Filed Apr. 29, 1975, Ser. No. 572,768
Int. Cl.² B23K *11/24*
U.S. Cl. 219—109 **10 Claims**



1. A method of measuring a plurality of characteristics of a weld during a welding process in which a workpiece is clamped between two welder electrodes, one of which is movable to permit a change in electrode separation due to a dimensional change of the weld in the workpiece during a weld cycle, said method comprising:

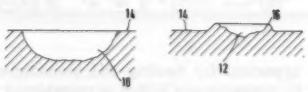
selecting a plurality of predetermined time brackets within an individual weld cycle such that each bracket corresponds to one of the characteristics; and

measuring the change in electrode separation during each of said time brackets, whereby each measurement represents an indication of a weld characteristic for its corresponding time bracket.

4,028,523
ENERGY-BEAM ENGRAVING METHOD AND AN APPARATUS FOR CARRYING IT OUT

Peter Anderl; Monika Geffcken, and Joachim Geissler, all of Munich, Germany, assignors to Steigerwald Strahltechnik GmbH, Germany

Filed Dec. 9, 1975, Ser. No. 639,127
Claims priority, application Germany, Dec. 10, 1974, 2458370
Int. Cl.² B23K *9/00*
U.S. Cl. 219—121 EM **4 Claims**

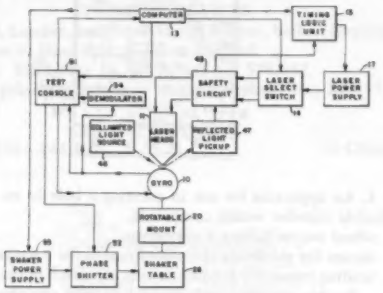


1. A method of energy beam engraving a workpiece having a workpiece surface comprising the following steps: directing an energy beam successively onto a plurality of discrete positions on said workpiece surface, said energy beam being adapted to produce a depression in said workpiece surface the depth and area of which increases with increasing dwell time, controlling the dwell time each position so as to produce smaller depressions and larger depressions, focusing said beam in a focus plane which lies within said workpiece in the vicinity of said workpiece surface, and controlling the focus of said beam so that said focus plane is nearer to the surface during production of said smaller depressions than during production of said larger depressions.

4,028,524
BALANCING SYSTEM FOR A ROTATING MASS

Dean H. Moll, Wayne, and Alan Greiner, Cedar Grove, both of N.J., assignors to The Singer Company, Little Falls, N.J.

Division of Ser. No. 483,149, June 26, 1974, Pat. No. 3,935,746, which is a division of Ser. No. 169,661, Aug. 6, 1971, Pat. No. 3,795,784. This application Apr. 24, 1975, Ser. No. 571,482
Int. Cl.² B23K *26/00*
U.S. Cl. 219—121 L **1 Claim**



1. A method of balancing a free rotor gyroscope having a flywheel mounted for rotation about a spin axis and for pivotal displacement with respect to a pivotal plane perpendicular to the spin axis, comprising the steps of measuring the mass unbalance, radial unbalance and modulation of the spinning flywheel, and selecting and executing the following laser burn patterns based on the presence and absence of predetermined combinations of excess modulation, mass unbalance and radial unbalance:

a. aiming and firing a predetermined number of laser beam bursts at a single point on the circumference of the flywheel on one side of the pivotal plane depending on the sign of mass unbalance and at an angular location corresponding to the radial unbalance when an excess radial unbalance and an excess mass unbalance have been detected;

b. aiming and firing a predetermined number of pairs of laser beam bursts 180° apart from each other on opposite sides of the circumference of the flywheel on the same one side of the pivotal plane and equidistant therefrom depending on the sign of the mass unbalance when only an excess mass unbalance has been measured;

c. aiming and firing a predetermined number of pairs of laser beam bursts located at the same angular position on the circumference of the flywheel corresponding to the radial unbalance above and below the pivotal plane and equidistant therefrom when only an excess radial unbalance has been measured; and

d. aiming and firing a predetermined number of pairs of laser beam bursts located 180° apart from each other on opposite sides of the circumference of said flywheel and on opposite sides of said pivotal plane and equidistant therefrom at angular locations corresponding to the modulation unbalance when an excess modulation unbalance has been measured.

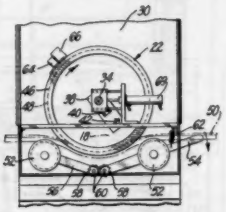
4,028,525
APPARATUS FOR CREATING HOLES IN FLEXIBLE MEMBERS

David E. Mominee, Alpine, and Gilbert W. Vance, Jamul, both of Calif., assignors to Reed Irrigation Systems, El Monte, Calif.

Continuation of Ser. No. 460,812, April 15, 1974, abandoned, which is a division of Ser. No. 239,921, March 31, 1972, Pat. No. 3,808,394. This application Nov. 6, 1975, Ser. No. 629,494

Int. Cl.[2] H05B 9/00

U.S. Cl. 219—121 L 15 Claims



1. An apparatus for use in creating a hole in an elongated flexible member which comprises:

wheel means having a periphery;

means for mounting the wheel means for rotation;

holding means for holding at least a portion of the elongated flexible member with respect to said periphery so that there is substantially no relative movement between said portion of said flexible member and said wheel means as said wheel means rotates;

reflecting means for reflecting a laser beam;

first means for rotatably mounting said reflecting means for rotation in synchronism with said wheel means;

laser means for creating and directing a laser beam toward said reflecting means; and

said reflecting means being positioned relative to said laser means and said wheel means so that the laser beam emitted from said laser means is directed toward a specific area of said portion of said flexible member during rotation of said wheel means through an arc with the laser beam intersecting said specific area at a first angle, said first angle being constant for the period that the wheel means rotates through said arc.

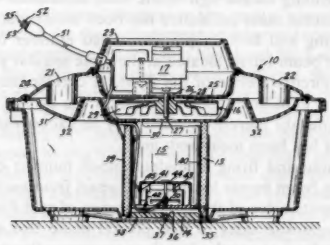
4,028,526
ELECTRICALLY GROUNDED VAPORIZER STRUCTURE

George W. Schossow, 2316 Lilac Lane, White Bear Lake, Minn. 55110

Continuation-in-part of Ser. No. 832,279, June 11, 1969, Pat. No. 3,809,374. This application Feb. 21, 1974, Ser. No. 444,337

Int. Cl.[2] H05B 1/02, 3/60; H02H 1/02; F22B 1/30

U.S. Cl. 219—295 16 Claims



1. A vaporizer for vaporizing water to steam and mixing the steam with air and dispensing a moist air below scalding temperature, said vaporizer comprising

a base defining a reservoir for liquid,

a plate supported in said base,

a cover supported on said base, said cover supporting a tubular member which has one end joined in abutting mating engagement with said plate to form a boiling chamber, an electrically driven fan supported in a manifold within said cover and in communication with the base and the boiling chamber to draw steam from said boiling chamber and air from said base into said manifold to be discharged therefrom through a discharge outlet, valve means permitting water to flow from said reservoir to said boiling chamber, and electrode heating means disposed in said boiling chamber to boil the water therein by electrical resistance of the water, and

an electrical circuit for energizing said electrode heating means and said fan, said circuit including a ground line for providing ground potential, an electrically energizable switching means for connecting said fan and the electrodes of said electrode heating means to a source of potential through a hot and neutral line respectively, a momentary contact switch connected in series with said hot line and said switching means for energizing said switching means, said circuit for said switching means, momentary contact switch, hot line and ground line being such that said switching means can be energized by said momentary contact switch only when ground potential is present to said circuit via said ground line, and a sensing member connected in series with said switching means and positioned in said base adjacent one of an element of said boiling chamber carrying current and an electrode of said electrode heating means disposed in said base to close said circuit including said switching means for holding said switching means energized only when there is water in said base above a predetermined minimum level to cover said sensing member for holding said fan and electrode heating means energized.

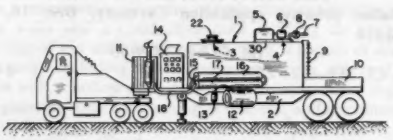
4,028,527
APPARATUS AND CONTROL SYSTEM FOR HEATING ASPHALT

George F. Thagard, Jr., 60 Linda Isle, Newport Beach, Calif. 92660

Filed Dec. 2, 1974, Ser. No. 528,732

Int. Cl.[2] F24H 1/18; H05B 1/00

U.S. Cl. 219—311 38 Claims



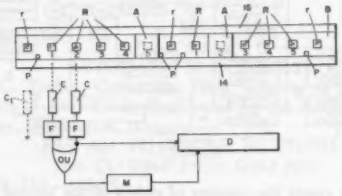
1. An apparatus for heating and maintaining an asphalt material to temperatures within a preselected range which comprises an enclosed vessel configured to contain the material in at least one of a solid and liquid state, inlet means for introducing the material into the vessel in at least one of a solid and liquid state, means for heating at least one of the wall portions of the vessel to maintain the temperature of at least one of the inner wall portions which contact the material therein and the material in the vessel above the melting temperature and below the decomposition temperature of the asphalt material, the surface area of heated wall portions contacting the material being sufficient to transfer heat to the material at least sufficient to maintain the temperature of the material to within said preselected range in a manner to avoid causing substantial decomposition thereof, control means for selectively controlling the temperatures of the heating means

to maintain at least one of the inner wall portions of the vessel contacting asphalt material thereon and the asphalt material in the vessel within said preselected temperature range, venting means communicating an upper portion of the vessel with an atmosphere outside of the vessel, filtering means capable of filtering vapors such as condensible hydrocarbon vapors communicating with said venting means, and outlet means for removing the material from said vessel.

4,028,528
CODE SCANNING SYSTEM

Daniel Staes, Bretigny sur Orge, France, assignor to Rapistan, Incorporated, Grand Rapids, Mich.

Filed Feb. 27, 1976, Ser. No. 662,005
Claims priority, application France, Feb. 28, 1975, 75.06486
Int. Cl.² G06K 7/10; G02B 5/12
U.S. Cl. 235—61.11 E **13 Claims**

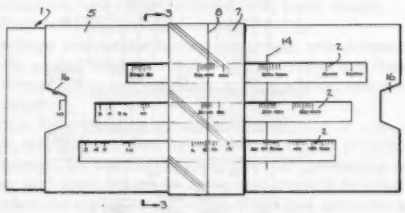


1. A code scanning system comprising:
a code strip including a plurality of spaced code elements arranged in a row and selectively obstructed to define a code,
a plurality of detectors positioned in a row aligned to permit serial scanning of said code strip when said code strip and said detectors are moved relative to one another said detectors spaced such that adjacent detectors are simultaneously aligned with adjacent code elements for detecting said code elements,
logic circuit means coupled to said detectors for providing a timing signal in response to the direction of a code element, and
circuit means coupled to one of said detectors and to said logic circuit for receiving signals therefrom representative of a code encoded in said code strip.

4,028,529
CURRENCY EXCHANGE CALCULATOR

George W. Van De Weghe, 477 Colonial Road, Ridgewood, N.J. 07450

Filed Aug. 28, 1975, Ser. No. 608,757
Int. Cl.² G06G 1/02
U.S. Cl. 235—89 R **7 Claims**

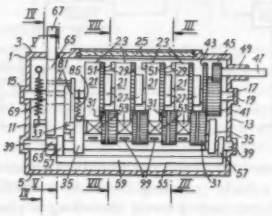


1. A currency exchange calculator for simultaneously displaying the monetary unis of two currencies that are related by a conversion factor comprising: (a) a slide having a plurality of parallel quasi-logarithmic scales thereon with at least one said scale being laterally displaced relative to another of said scales by a predetermined factor of displacement not related to the conversion factor, (b) a sleeve slidably engaged about at least a portion of said slide and including means for exposing at least a portion of each of said quasi-logarithmic scales and said sleeve further including a sleeve index means for indexing the position of said sleeve relative to at least one of said scales, and (c) a cursor slidably engaged about at least a portion of said sleeve and including a cursor index means for indexing the position of said cursor relative to at least one of said scales.

4,028,530
COUNTING DEVICES

Hans Bud, London, and Peter Alway, Bushey, both of England, assignors to Hans Bud, London, England

Filed May 16, 1975, Ser. No. 578,342
Claims priority, application United Kingdom, May 22, 1974, 22945/74
Int. Cl.² G06C 15/42
U.S. Cl. 235—144 HC **8 Claims**



1. A resettable counting device comprising:
coaxial number wheels;
a reset cam provided with each number wheel to rotate therewith;
a transfer pinion shaft displaceable relatively to the number wheels;
transfer pinions rotatably mounted on said shaft and disposed respectively intermediate successive number wheels, each pinion during counting operations of the device meshing with gear teeth on one of the number wheels adjacent thereto and engaging drive means on the other number wheel during rotation of said other number wheel thereby partially to rotate said one of the number wheels;
a cradle having parallel end members extending transversely with respect to the number wheel axis, a longitudinal member connected therebetween, and first and second abutment means;
reset fingers supported on said longitudinal member of the cradle so as to be out of contact with the reset cams during counting operations and to be together rotatable about a common axis to engage respectively with the reset cams to reset the number wheels;
a reciprocably movable actuating member adapted during movement thereof in one sense to effect displacement of the transfer pinion shaft thereby to disengage the transfer pinions from the number wheels and subsequently to engage said first abutment means thereby rotating said reset fingers and adapted upon movement in the reverse sense to be repositioned for subsequent resetting operations; and
flexible members disposed to be out of contact with the transfer pinions during counting operations and located so as to be engaged respectively by the transfer pinions subsequent to the disengagement thereof from the number wheels thereby to reorientate the transfer pinions, and so as to be engaged subsequently by said second abutment means upon rotation of the reset fingers, the

engagement with the second abutment means serving to stress the flexible members so that contact between the pinions and the flexible members is maintained until remeshing of the pinions with the number wheels takes place, the flexible members thereafter disengaging from the pinions.

4,028,531

SYSTEM FOR DISPLAYING INFORMATION ABOARD A MOVING OBJECT

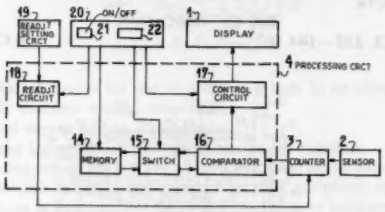
Jean Cottin, and Jean Laxague, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Nov. 20, 1975, Ser. No. 633,865

Claims priority, application France, Nov. 21, 1974, 74.38280

Int. Cl.² G06F *15/20*; G09B *29/10*

U.S. Cl. 236—150.2 **12 Claims**



1. A system for giving positional information to passengers aboard a vehicle traveling between a starting point and a terminal point over a route including a plurality of transit points, comprising:

memory means for storing numerical data corresponding to the lengths of sections of said route extending between said points;

odometric means on said vehicle for continuously registering the distance traveled from a reference point on said route;

display means on said vehicle for visually indicating to its occupants the current position of the vehicle with reference to said points, said display means including a plurality of markers individually assigned to said transit and terminal points;

comparison means provided with first and second inputs respectively coupled to said memory means and to said odometric means for generating a control signal upon the data on said inputs matching each other;

sequencing means connected to said comparison means for calling forth from said memory means, at said reference point, the stored data relating to the length of the first route section still to be traveled and for thereafter calling forth, in response to control signals emitted by said comparison means, the stored data relating to the lengths of successive route sections for transmission to said first input; and

circuit means connected between said comparison means and said display means for activating, in response to said control signal, the marker indicatng a point at the end of the route section to be traveled next.

4,028,532

TURBINE SPEED CONTROLLING VALVE OPERATION

John F. Reuther, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 247,888, April 26, 1972, abandoned. This application Nov. 2, 1973, Ser. No. 412,513

Int. Cl.² F01D *19/00*

U.S. Cl. 235—151.1 **27 Claims**

1. A system for operating a turbine in which an elastic fluid imparts rotation to the turbine, comprising

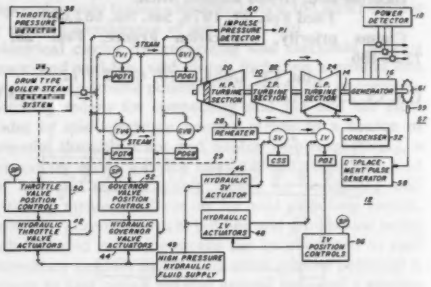
valve means for controlling the flow of elastic fluid to the turbine,

means for controlling the valve means in accordance with a desired turbine speed,

means for generating a first series of pulses at a rate proportional to the rotational speed of the turbine,

means for generating a second series of pulses at a predetermined rate, which rate is substantially greater than the generated rate of the first series at the upper range of turbine speed,

means to count the number of pulses of the first series during a predetermined time interval,



means to count the number of pulses of the second series during the generation of a predetermined number of pulses of the first series,

means to generate a first signal corresponding to the counted number of the first series of pulses,

means to generate a second signal corresponding to the counted number of the second series of pulses,

means governed by a predetermined rotational speed of the shaft and the count of the first and second series of pulses to select one of the first and second signals, and

means to operate the valve control means in accordance with the selected one of the first and second signals.

4,028,533

ROBOT MOVABLE IN A GROUP

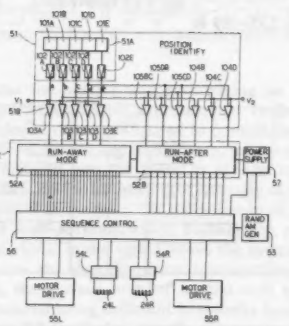
Sueo Matsubara, Tokyo, Japan, assignor to Techno-Venture Co., Ltd., Japan

Filed Dec. 29, 1975, Ser. No. 644,469

Claims priority, application Japan, Dec. 31, 1974, 50-3345; Dec. 31, 1974, 50-3346; Dec. 31, 1974, 50-3347; Dec. 31, 1974, 50-3348

Int. Cl.² B26D *1/02*

U.S. Cl. 235—151 **33 Claims**



1. Robots movable in a group, each of said robots being movable in one of at least two different modes of movement at a time and comprising:

identifying means for identifying the relative positions between this robot and the other robots of the group and for thereby generating a position signal representing the relative positions between said this robot and said the other robots of the group;

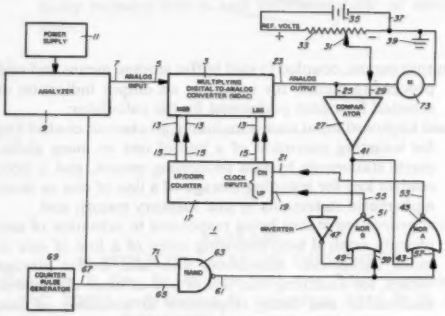
mode control means operatively associated with said identifying means for selecting one mode at a time out of said at least two different modes in accordance with said position signal received from said identifying means and for thereby generating a mode signal corresponding to said selected mode; and

moving means operatively associated with said mode control means for receiving said mode signal and for thereby actuating said this robot to move in one of said at least two modes which is selected by said mode control means.

4,028,534
AUTOMATIC SPAN CIRCUIT

Huel C. Tucker, Centerville, Ohio, assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 14, 1976, Ser. No. 676,951
Int. Cl.² G06F *15/20;* **G06J** *1/02*
U.S. Cl. 235—151.35 **9 Claims**



1. An automatic gain control system comprising:

a multiplying digital-to-analog converter having an analog voltage input, an analog voltage output, and N digital input channels, where N is an integer greater than one, and having the characteristic that its analog output is a linear function of the product of its analog input and its digital input;

a binary UP/DOWN counter having N digital counting channels connected, respectively, to said N converter channels, and UP/DOWN counting input means;

a fixed reference voltage source;

a voltage comparator having two inputs, one connected to the analog voltage output of said converter and the other connected to said reference voltage source, and a binary output;

means for generating a pulse train;

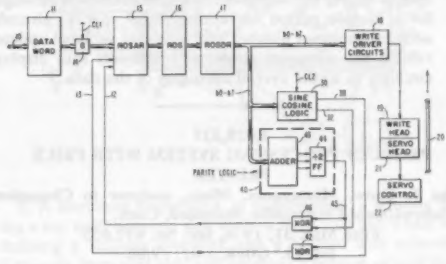
gate means, controlled by said binary output of said comparator, for connecting said pulse train generating means to said input means to cause said counter to count UP when the analog output voltage from said converter is less than the reference voltage and to count DOWN when the analog output voltage is greater than the reference voltage; and

a voltage-responsive meter, connected to said analog voltage output of said converter, calibrated to register the analog voltage input to said converter.

4,028,535
APPARATUS AND METHOD FOR GENERATING A DATA CODE WITH A SPECTRAL NULL

Peter Anthony Franaszek, Ossining, and David Allen Thompson, Somers, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 11, 1976, Ser. No. 695,295
Int. Cl.² G06F *13/04, 7/38, 15/34*
U.S. Cl. 235—152 **7 Claims**



1. In a code signaling system,

translating means for translating coded data to provide a spectral null at a predetermined frequency including an addressable translating apparatus for providing a coded output signal in response to a coded input signal,

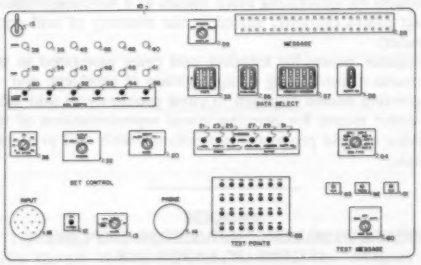
monitoring means for monitoring the output signals from said translating apparatus with respect to predetermined limit conditions for providing code selection data as a function of said output signals,

said monitoring means having an output connected to supply said code selection data to modify the input signal to said translating means whereby said spectral null is achieved at said predetermined frequency.

4,028,536
SNAIAS DIGITAL DATA TEST SET

John William Woodward, Virginia Beach, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 27, 1976, Ser. No. 661,901
Int. Cl.² H04B *3/46, 17/00;* **G08C** *25/00*
U.S. Cl. 235—153 A **20 Claims**



1. A portable Ship's Navigation Aircraft Inertial Alignment System Digital Test Set which evaluates the availability and adequacy of the data link navigation messages, transmitted between the shipboard navigation system and the aircraft inertial alignment system via a digital data radio link, umbilical cable or both, comprising:

power distribution circuitry which develops and distributes power signals throughout said test set;

timing circuitry which produces timing signals that control the processing of received data;

display circuitry which source selects and receives cable

data, transmitted RF data or both, checks the adequacy of the data for a sample period, displays a good or bad data evaluation, shapes, aligns and gates said data into a serial digital signal, converts said digital signal into a parallel data signal and provides semi-permanent storage to display data; and,

data check circuitry which decodes the operating mode, alignment or waypoint, of said test set, evaluates the received data, checks each message for a sample period for correct lable, parity, validity and alignment sublabel update rate in the alignment mode, checks each message for a sample period for correct label, parity, aircraft address, waypoint number and waypoint sublabel update rate in the waypoint mode, and instructs said display circuitry as to the overall adequacy of the data.

4,028,537

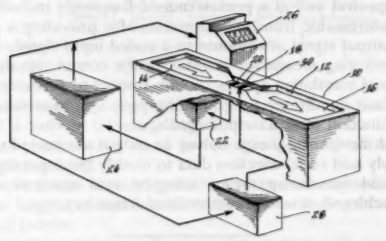
PRODUCT PROCESSING SYSTEM WITH PRICE PRINTER

John E. Snow, Minneapolis, Minn., assignor to Champion International Corporation, Stamford, Conn.

Filed Mar. 31, 1976, Ser. No. 672,055

Int. Cl.² G06K *3/02, 19/06*

U.S. Cl. 235—61.9 R **3 Claims**



1. A product check out system comprising:

a. a checkout stand including therein an automatic label reader means disposed on an upper surface thereof, said label reader means being capable of reading a plurality of universal product codes carried on said products and generating product-identifying signals corresponding thereto as each product is moved pass said label reader;

b. computer means responsive said product-identifying signals for generating price signals as a function of product prices currently stored in the memory of said computer;

c. register means for totalling said price generated in the course of processing an aggregation of products; and

d. printing means disposed in close proximity to said label reader means for printing visual representations of the price on said product in accordance with said price signals.

4,028,538

PROGRAMMABLE CALCULATOR EMPLOYING ALGEBRAIC LANGUAGE

Emil Edward Olander, Jr., Fort Collins; Rex L. James, Loveland; Ivar W. Larson, Loveland; Wayne F. Covington, Loveland; Jack M. Walden, Loveland; Robert E. Watson, Loveland; Francis J. Yockey, Loveland; Fred Wenninger, Jr., Loveland, and Homer C. Russell, Berthoud, all of Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Division of Ser. No. 212,581, Dec. 27, 1971, Pat. No. 3,839,630. This application Sept. 30, 1974, Ser. No. 510,921

Int. Cl.² G06F *7/38, 15/02*

U.S. Cl. 235—156 **20 Claims**

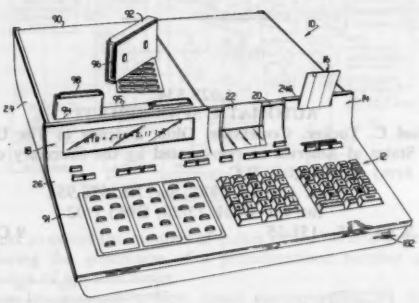
1. An electronic calculator comprising:

keyboard input means including a plurality of keys for entering lines of one or more alphameric statements each into the calculator;

buffer storage means, coupled to said keyboard input means, for storing each line of one or more alphameric statements as it is entered into the calculator from said keyboard input means;

memory means, coupled to said buffer storage means, for storing lines of one or more alphameric statements each entered into the calculator;

processing means, coupled to said keyboard input means, buffer storage means, and memory means, for selectively processing either a line of one or more alphameric statements entered into the calculator and stored in said buffer storage means or lines of one or more alphameric statements stored in said memory means to perform selected functions; and



output means, coupled to said buffer storage means and said processing means, for providing an output indication of selected functions performed by the calculator;

said keyboard input means including an execute control key for initiating execution of a line of one or more alphameric statements by said processing means, and a store control key for initiating storage of a line of one or more alphameric statements in said memory means; and

said processing means being responsive to actuation of said execute control key, following entry of a line of one or more alphameric statements into said buffer storage means, for executing that line of one or more alphameric statements, and being responsive to actuation of said store control key, following entry of a line of one or more alphameric statements into said buffer storage means, for storing that line of one or more alphameric statements in said memory means.

4,028,539

MEMORY WITH ERROR DETECTION AND CORRECTION MEANS

Pieter Anton Jacobs, Apeldoorn, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 20, 1975, Ser. No. 633,575

Claims priority, application Netherlands, Dec. 9, 1974, 7415966

Int. Cl.² G06F *11/00;* **G11C** *29/00*

U.S. Cl. 235—153 AM **2 Claims**

1. A memory comprising:

a first plurality of memory units, a first input address line connected to said memory units for delivering a first partial address thereto, said first plurality of memory units having valid partial addresses in a first partial address sequence from a specified first to a specified second memory unit;

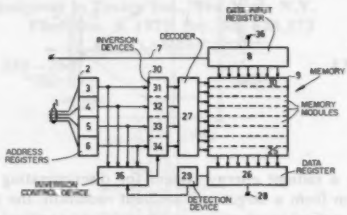
a second input address line connected to said memory units for addressing individual bits of one of said memory units;

a data input register connected to said plurality of memory units;

a data output register connected to said plurality of memory units;

a detection device connected to said data output register for detecting a non correctable storage error and producing an output signal;

an inversion device connected to said first input address line for inverting predetermined address bits, thereby allowing addressing of said first plurality of memory units in a second partial address sequence starting from a third memory unit;



an inversion control device, having an input connected to said detection device, and an output connected to said inversion device for activating said inversion device; and

blocking means for blocking addressing of ones of a second plurality of memory units beyond a predetermined fourth memory unit, said blocking means and said inversion control device being linked for blocking addressing of a faulty memory unit in said second plurality of memory units.

4,028,540

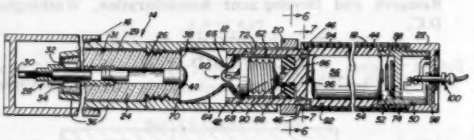
FLASHLIGHT MARKING IMPLEMENT

Columbus B. Key, Jr., 49 New York Ave. NW., Washington, D.C. 20001, and Vincent M. Spaulding, 2914 W St. SE., Washington, D.C. 20020

Filed Nov. 11, 1975, Ser. No. 630,885

Int. Cl.² B43K 5/12; F21Y 33/00

U.S. Cl. 240—6.46 **9 Claims**



8. An illumination implement comprising an elongated tubular body having a light emitting end section and an opposite end section enclosing a source of illumination, a housing having a tubular end portion projecting into the opposite end section of the tubular body and a protective portion enclosing an internal source of electrical energy in axially spaced relation to the tubular body, energizing circuit means carried on the housing for conducting electrical energy from said internal source to the source of illumination, and switch means mounted on the tubular end portion of the housing axially between the tubular body and the protective portion of the housing for selectively connecting the internal source to the source of illumination through the circuit means.

4,028,541

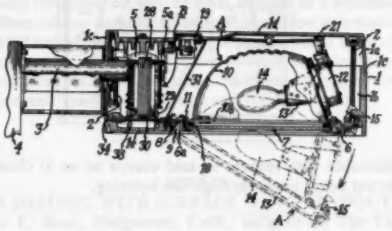
LUMINAIRE

John S. Franklin, Hendersonville, N.C., assignor to General Electric Company, New York, N.Y.

Filed Nov. 11, 1974, Ser. No. 522,439

Int. Cl.² F21S 1/10, 3/10, 13/10

U.S. Cl. 240—25 **4 Claims**



1. A luminaire comprising, in combination, a housing having a top wall, opposite side walls, a front wall and a rear wall defining a housing chamber and a bottom wall extending forwardly from said rear wall covering a portion of said housing chamber and defining with said side walls and said front wall a bottom opening at the front portion of said housing chamber, and a combined closure and optical assembly arranged in said front portion of said housing chamber detachably secured to said housing for movement as a unit to a closed operative position covering said bottom opening and an open inoperative position away from said bottom opening, said combined closure and optical assembly comprising a concave reflector, a light transmitting member and frame means joined together and defining an optical enclosure, said concave reflector having a front side formed with an aperture, and combined lamp holder and cover means detachably mounted on said reflector covering said front aperture therein and having lamp support means extending through said front aperture for holding a lamp within said optical enclosure, said front aperture being sufficiently large for passage of the lamp therethrough so that said lamp support means with lamp attached thereto is removable as a unit from said optical enclosure upon detachment from said reflector, and coacting separable electric connecting means on said housing and said combined closure and optical assembly adjacent said front wall for automatically making and breaking electrical connection between the lamp and an electrical supply upon respectively closing and opening said combined closure and optical assembly.

4,028,542

FACETED PARABOLIC-TYPE REFLECTOR SYSTEM

Glen Harold McReynolds, Jr., Houston, Tex., assignor to Esquire, Inc., New York, N.Y.

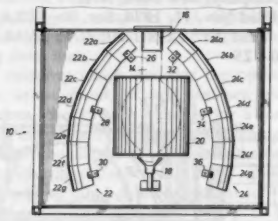
Continuation-in-part of Ser. No. 505,140, Sept. 11, 1974, abandoned. This application Apr. 16, 1975, Ser. No. 568,725

Int. Cl.² F21V 7/09

U.S. Cl. 240—41.36 **7 Claims**

1. A luminaire adaptable for securing therein a light source through which an optical axis passes, and having an opening through which light from the source is emitted, including a reflector having a plurality of substantially contiguous planar segments, said segments forming a part of a circular arc in a plane behind the source and parallel to the opening to one side

of the axis, said arc approximating a parabolic shape with the center of the source at its focus, said reflector parabolically



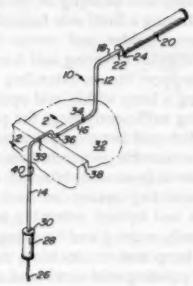
positionable with respect to said source so as to change the reflected beam angle through the opening.

4,028,543

BASELESS LAMP

Joseph Oster, Allentown, Pa., assignor to Keystone Lamp Manufacturing Corporation, Slatington, Pa.

Filed Mar. 3, 1976, Ser. No. 663,320
Int. Cl.² F21V *21/08, 21/20;* **A47G** *29/30*
U.S. Cl. 240—52.1 **6 Claims**



1. A lamp comprising:

an elongated tubular support member;

said support member having a substantially downwardly extending portion, a substantially upwardly extending portion spaced from said downwardly extending portion and a substantially horizontally extending portion connected between the lower end of said upwardly extending portion and the upper end of said downwardly extending portion;

friction means covering at least part of at least the underside of said horizontally extending portion, said friction means being adapted to rest on a support surface for supporting said lamp;

a lamp fixture mounted on said upwardly extending portion of said support member adjacent the upper end thereof; and

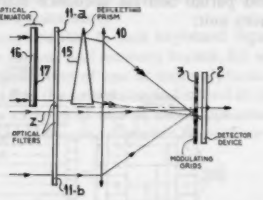
a counterweight means mounted on said downwardly extending portion of said lamp support adjacent the lower end thereof, the weight of said counterweight means being such that the center of gravity of the lamp is below said horizontally extending portion whereby said lamp is balanced in a substantially upright position when said friction means is resting on a support surface.

4,028,544

RADIANT ENERGY DETECTION SYSTEM

Francis Jourdan; Georges Couderc, and Serge Ediar, all of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Apr. 5, 1976, Ser. No. 673,818
Claims priority, application France, Apr. 7, 1975, 75.10741
Int. Cl.² G01J *1/20*
U.S. Cl. 250—203 R **9 Claims**



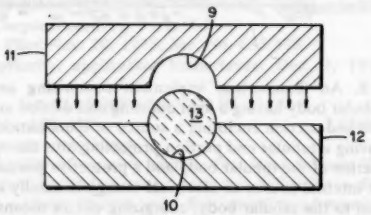
1. In a radiant energy system for discriminating between radiation from a target and ambient radiation, the combination of: optical receiver means comprising an optical objective for focusing the said radiation originating from an observed field, an optical splitter device for producing two optical channels, a first optical filter in a first of said channels having a pass-band corresponding substantially to the said target radiation spectrum, a second optical filter in the second of said channels having a pass-band corresponding to a portion of the said ambient radiation spectrum and outside the target spectrum and optical attenuating means for balancing the ambient radiation levels in the two channels; reticle means for modulating the focused radiation by means of grids comprising, in a plane, transparent zones separated by opaque zones said grids being moved substantially in the focal plane of said optical objective in a direction transverse to that of the optical axis of said objective; photodetection means behind said reticle means for detecting the modulated and filtered radiation and a circuit for processing the detected signals; the said optical splitter device producing in combination with said objective two images of the said field, one for each channel, which are staggered in the plane of the grids in the said direction by an amount substantially equal to the diameter of the target image, the dimension of the said zones in this direction being a multiple of and at least equal to this diameter.

4,028,545

METHOD OF SIMULATING SPHERICAL VOIDS FOR USE AS A RADIOGRAPHIC STANDARD

Billy E. Foster, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Feb. 17, 1976, Ser. No. 658,806
Int. Cl.² G01D *18/00*
U.S. Cl. 250—252 **2 Claims**



1. A method of providing radiographic standards for weld voids comprising the step of radiographing a bead of low atomic number material of a desired size which bead is encased in etched, identical, opposing hemispheres of two plates

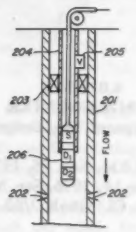
of welding material bonded together, said bead being at a first given distance from an X-ray film, and repeating the above step a plurality of respective times using various other proportional distances between the bead and other X-ray films, whereby the resulting radiographs serve as standards for use in quality control comparisons of voids in actual welds.

4,028,546

BEHIND WELL CASING WATER FLOW DETECTION SYSTEM

Harold E. Peelman, and Obie M. Langford, both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,172
Int. Cl.² G01V 5/00
U.S. Cl. 250—266 **12 Claims**



1. Apparatus for detecting undesired behind casing water flow in a producing well comprising:

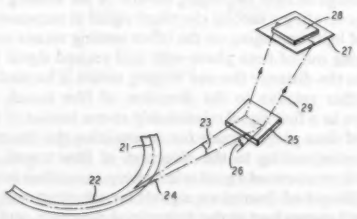
a modular downhole sonde assembly sized and adapted for passage through a cased well borehole, said modular assembly being fluid tight and pressure resistant when assembled and having at least three modules comprising a first module housing a source of high energy neutrons capable of providing a flux of high energy neutrons at least some of which have energy sufficient to cause the nuclear reaction O^{16} (n,p) N^{16}, a second module housing at least two longitudinally spaced gamma ray detectors and a neutron shielding means for reducing direct irradiation of said detectors by said source, and a third module housing control and signal transmission electronic systems for controlling said source or said detectors and for transmitting signals from said sonde to and from surface equipment, said first and second modules being arranged so that they may be connected to each other in end to end relationship with either said first module or said second module above said first module while maintaining approximately the same longitudinal spacing between said source and said detectors.

4,028,547

X-RAY PHOTOLITHOGRAPHY

Peter Michael Eisenberger, Morristown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 30, 1975, Ser. No. 591,695
Int. Cl.² H01J 37/00
U.S. Cl. 250—272 **3 Claims**



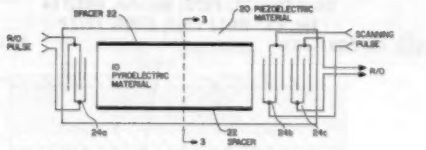
1. Method of photolithographic processing comprising directing a beam of electromagnetic radiation in the wavelength range 1 A to 50 A through a shadow mask, against a device precursor consisting of a substrate and an image forming layer, sensitive to the radiation, producing a change in the cohesiveness of the irradiated portion of the layer CHARACTERIZED IN THAT the radiation is directed against the device precursor by means of Bragg reflection from an inhomogeneously reflecting crystalline body, which inhomogeneously reflecting crystalline body consists of a multitude of crystallites whose angular spread of crystalline orientation is from 10^{-4} radians to 10^{-1} radians of angle, which radiation is synchrotron radiation and which crystalline body is shaped so as to compensate for the angular deviation of the synchrotron radiation and produce a more nearly parallel beam.

4,028,548

IR IMAGING WITH SURFACE WAVE READOUT

Marion L. Scott, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 29, 1976, Ser. No. 671,234
Int. Cl.² H01J 31/49
U.S. Cl. 250—330 **8 Claims**



1. A device for IR imaging with surface wave readout comprising:

a pyroelectric stratum which is doped with an impurity to obtain a free carrier concentration in said stratum the free carriers being repelled from the surface of said stratum by a surface charge to form a depletion layer, the density of said surface charge being a function of the temperature of the incident radiation from an IR image;

a piezoelectric substrate parallel to the pyroelectric stratum and separated from it by spacers;

first means for propagating a first acoustic surface wave in the piezoelectric substrate, said wave transversing the substrate such that the electric field of the wave penetrates the pyroelectric stratum;

second means for propagating a second acoustic surface wave in the piezoelectric substrate, said second means located at the opposite end of the substrate from the first means so that second acoustic surface wave travels in the opposite direction from the first acoustic surface wave so as to amplitude modulate the first wave; and

output means for observing the amplitude modulated first wave after it has transversed the pyroelectric stratum located at the same end of the piezoelectric substrate as the second propagating means.

4,028,549

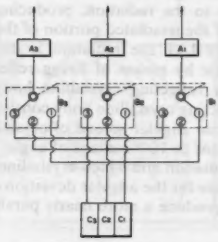
SYNCHRONIZED ACCUMULATING RADIODETECTOR

Shigeo Baba, 7649 Fuchu, Tokyo 183, Japan

Filed Dec. 8, 1975, Ser. No. 638,631
Claims priority, application Japan, Dec. 6, 1974, 49-140719
Int. Cl.² G01T 1/18
U.S. Cl. 250—336 **1 Claim**

1. A synchronized accumulating radiodetector comprising of a series of counting tubes of equal inner volume, a switching assembly synchronizing with the flow speed of radioactive substance traveling through or along side of said counting tubes, counting accumulators for the detected radioactivity

and an associated output system, wherein said counting tubes are longitudinally connected to each other at a fixed distance

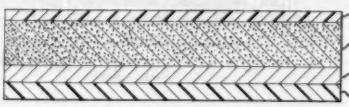


and said switching assembly is composed of a series of switching devices each provided at the corresponding counting tube.

4,028,550
X-RAY SCREENS

James Paul Weiss, Westfield, N.J., and Edward Dyal Smith, Towanda, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 22, 1975, Ser. No. 642,714
Int. Cl.² H01J *1/62*; C09K *11/12*
U.S. Cl. 250—483 **12 Claims**



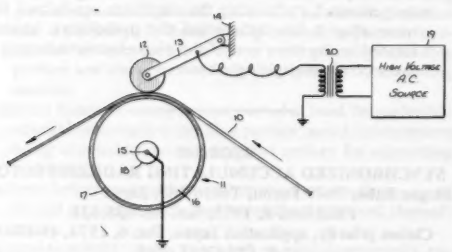
1. A luminescent composition comprising a mixture of a europium-activated barium fluorohalide phosphor and an aminocoumarin brightening agent in a binder.

5. An X-ray screen comprising a support bearing a thin layer of europium-activated Ba fluorohalide phosphor mixed with an aminocoumarin brightening agent and dispersed in a film-forming binder.

4,028,551
APPARATUS AND METHOD FOR CORONA DISCHARGE PRIMING A DIELECTRIC WEB

Kenneth P. Thompson, Canton, N.C., assignor to Champion International Corporation, Stamford, Conn.

Filed Oct. 17, 1975, Ser. No. 623,468
Int. Cl.² H01T *19/04*; B01K *1/00*
U.S. Cl. 250—531 **3 Claims**

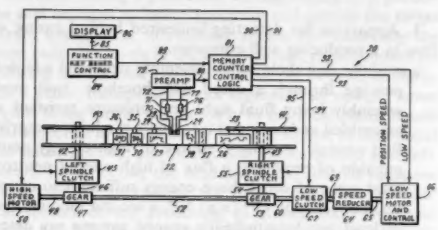


1. Apparatus for corona priming a dielectric web substrate for adhesion to plastic material comprising first and second rolls mounted for rotation on parallel axes, at least one of said rolls being mounted for biased movement towards the other roll, means for training said web between the nip of said first and second rolls for rolling engagement by both of said rolls, one of said rolls having as its entire web engaging surface the radially outer surface of a thin layer of dielectric material and means for effecting electrically conductive contact with substantially the entire radially inner surface of said dielectric layer, the other of said rolls having its entire web engaging surface formed of electrically conductive material, and means for supplying a corona producing voltage between said conductive material and said means for effecting conductive contact.

4,028,552
IMAGE COUNTER

Joseph A. Volk, Jr., Florissant, Mo., assignor to Beta Corporation, Bridgeton, Mo.

Division of Ser. No. 524,034, Nov. 15, 1974, abandoned. This application June 11, 1976, Ser. No. 695,168
Int. Cl.² G06K *7/10*
U.S. Cl. 250—570 **18 Claims**

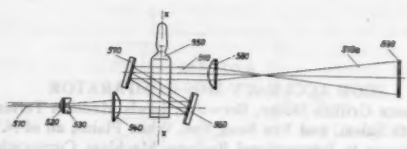


1. In an image counter having means for driving a film having image means thereon in a forward and reverse direction past a sensing means, said image means being defined from other areas of the film by the amount of light that passes therethrough, an automatic control system comprising at least two light sensing means located on one side of the film, one such light sensing means located at least in part ahead of the other relative to the direction of film travel, means for directing light toward the sensing means from the side of the film opposite the light sensing means such that the amount of light impinging on a sensing means varies as the various areas of the film pass between the light directing means and said light sensing means, whereby at least a portion of one of the light sensing means receives a change in the amount of light before any portion of the other light sensing means as each of the image means on the film moves past in either direction, an electrical circuit means, means associated with the electrical circuit means for generating a first electrical signal responsive to the change of light impinging on one of the sensing means, and for generating a second electrical signal in response to the change of light impinging on the other sensing means said first signal being out-of-time phase with said second signal in proportion to the distance the one sensing means is located ahead of the other relative to the direction of film travel, means responsive to a first signal relationship at one instant of time of the out-of-time phase signals for determining the direction of count corresponding to the direction of film travel, means responsive to a second signal relationship at another instant of time of the out-of-time phase signals for counting each image means as it moves past in the determined direction, and means responsive to said first and second electrical signals for stopping the film on a selected image.

4,028,553
APPARATUS FOR CONTROLLING PHARMACEUTICAL AMPOULES

Michel Farcinade, 19, rue des Delices, 1203 Geneva, Switzerland

Filed June 17, 1975, Ser. No. 587,759
Claims priority, application Switzerland, June 27, 1974, 8874/74; May 26, 1975, 6680/75
Int. Cl.² G01N 21/26
U.S. Cl. 250—576 **1 Claim**

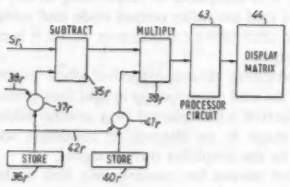


1. An apparatus for examining pharmaceutical ampoules containing an injectable liquid, comprising means for holding an ampoule vertically and for rotating the ampoule prior to an examination and holding it without rotation during the examination, a laser source, optical imaging means between said source and the ampoule to produce a laser beam in a vertical plane passing through the whole length of the ampoule, a multiplicity of photoelectric cells disposed to each receive at least a part of the beam having passed through the ampoule, and electrical means influenced by those cells having received light from the laser beam, for emitting a perceptible signal when the beam intercepts a solid particle in the liquid of an ampoule while the ampoule is at rest, said imaging means having a focal point and a numerical aperture enabling a focalization to produce an Airy spot for a conical beam of maximum length and minimum conicity, and said imaging means comprising a spherical beam-inlet lens and a cylindrical beam-outlet lens arranged to project a luminous bar in a focal axis at the center of an ampoule to be examined, the bar thickness being substantially that of the Airy spot at the focus of each spherical lens and at least one oblique mirror arranged in the path of the beam so that the beam passes through the ampoule at least two times each time at a different location.

4,028,554
RADIOLOGY

Godfrey Newbold Hounsfield, Newark, England, assignor to EMI Limited, Hayes, Middlesex, England

Filed June 5, 1975, Ser. No. 584,172
Claims priority, application United Kingdom, June 7, 1974, 25361/74
Int. Cl.² G01M 23/00
U.S. Cl. 250—445 T **10 Claims**

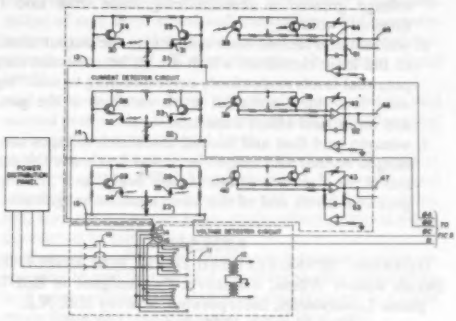


1. Radiological apparatus comprising source means for irradiating a body along a plurality of substantially co-planar paths, detector means for detecting the amount of radiation emergent from the body along each of said paths and for producing output signals indicative thereof, attenuator means, disposed between said source means and said detector means, constructed of regions of different thickness so as to substantially reduce variations in said output signals due to different lengths of said paths within said body, the material of said attenuator means being such as to alter, as a result of said different thickness, the spectrum of said radiation, and wherein means are provided for operating on said output signals to substantially reduce variations therein due to changes in the amount of radiation detected by said detector means attributable to said alteration in sprectrum.

4,028,555
POWER INTERRUPT TEST EQUIPMENT

Paul John O'Brien, Northfield, N.J., assignor to the United States of America as represented by the Secretary of the Department of Transportation, Washington, D.C.

Filed Nov. 17, 1975, Ser. No. 632,214
Int. Cl.² H01H 9/54
U.S. Cl. 361—76 **8 Claims**



1. A method of determining power interrupted and restoration performance characteristics of electrical equipment comprising the steps of,

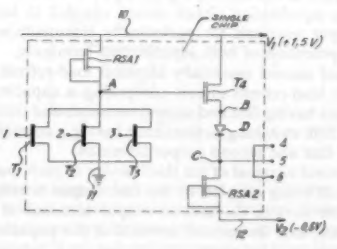
detecting the waveforms of the applied power, producing a control signal synchronous with selected phase angles of said waveforms,

and applying said signal to an electronic switch interconnecting said applied power to electrical equipment, whereby the power is interrupted at said selected phase angles.

4,028,556
HIGH-SPEED, LOW CONSUMPTION INTEGRATED LOGIC CIRCUIT

Gérard Cachier, and Jean Paul Puron, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Mar. 12, 1975, Ser. No. 557,784
Claims priority, application France, Mar. 12, 1974, 74.08256
Int. Cl.² H03K 19/08, 19/34, 19/36
U.S. Cl. 307—205 **3 Claims**



1. An integrated logic circuit, comprising a plurality of semiconductor elements on a single chip,

a. said plurality of elements include a plurality of input field effect transistors with gates for separately receiving

"high" and "low" logic potential levels symmetrical with respect to the ground potential level, sources connected to the ground terminal, and drains in common connected through a first node and a first saturable load to a first supply source of a predetermined polarity;

b. wherein said input transistors have a first threshold voltage;

c. wherein said plurality of elements further include an output field effect transistor with its gate connected to said first node, its drain directly connected to said first supply source and its source connected to a second node through a diode, said second node being connected through a second saturable load to a second supply source whose polarity is opposite to the polarity of said first supply source;

d. wherein said output transistor has a second threshold voltage greater in absolute magnitude than said first threshold voltage;

e. wherein said second node constitutes the output terminal of the logic circuit on which are to be collected output potential levels respectively corresponding to said "high" and "low" logic potential levels received at the gate of any input field effect transistor;

f. wherein said first and second threshold voltages are arranged so that said output potential levels are the opposite of the algebraic values of said "high" and "low" logic potential levels and of the same absolute magnitude.

4,028,557

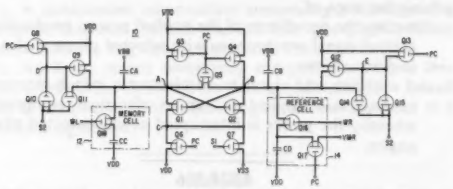
DYNAMIC SENSE-REFRESH DETECTOR AMPLIFIER

Dennis Robert Wilson, Allentown, Pa., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 21, 1976, Ser. No. 688,586

Int. Cl.² H03K *5/20, 3/286, 3/353;* **G11C** *7/06*

U.S. Cl. 307—362 **5 Claims**



1. A sense-refresh detector comprising:

first and second switching devices, each device having a control terminal and first and second output terminals;

first and second input/output terminals, the first output terminal of the first device and the control terminal of the second device being coupled to the first input/output terminal and the first output terminal of the second device and the control terminal of the first device being coupled to the second input/output terminal,

voltage equalization circuit means coupled to both input-/output terminals for periodically essentially equalizing the potentials of both input/output terminals;

first and second essentially identical load-refresh circuits, each load-refresh circuit comprising a capacitor circuit means having first and second terminals and third, fourth, and fifth switching devices each having a control terminal and first and second output terminals;

the control terminal of the third device of each load-refresh circuit being coupled to the first output terminal of the fourth device, the second output terminal of the fifth device, and the second terminal of the capacitor circuit means;

the second output terminals of the third and fourth devices being coupled together and being coupled to one input-/output terminal;

voltage setting circuit means being coupled to the second output terminals of the first and second devices for periodically setting the potential of said terminals to a preselected potential; and

conductive enabling circuit means being coupled to the second output terminals of the first and second switching devices for periodically facilitating conduction through the first and/or second switching device.

4,028,558

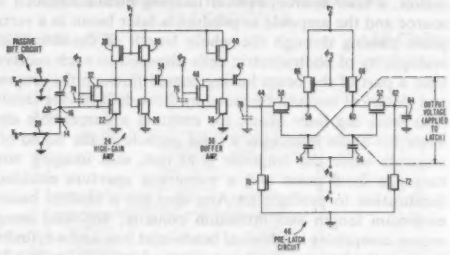
HIGH ACCURACY MOS COMPARATOR

Lawrence Griffith Heller, Brewster; Lewis Madison Terman, South Salem, and Yen Sung Yee, White Plains, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 21, 1976, Ser. No. 698,622

Int. Cl.² H03K *5/20, 3/353;* **H03F** *3/16;* **H04B** *15/00*

U.S. Cl. 307—355 **8 Claims**



1. A voltage comparator comprising

a differencing circuit for producing a difference signal indicating the polarity of the difference between two input signals,

an amplifier having an input node for receiving said difference signal and an output node for manifesting an amplified signal,

first switching means effective when placed in a first state to establish a biasing connection for setting said amplifier at a predetermined operating point which will be maintained after such connection is interrupted and effective when placed in a second state to interrupt such connection, leaving said amplifier biased at said operating point,

output circuitry for receiving signals manifested at the output node of said amplifier, said output circuitry including at least one stage which can be set to a first condition wherein it is incapable of responding to any signal manifested at said amplifier output node and settable thereafter to an alternative condition in which it is responsive to such a signal,

second switching means effective when placed in a first state to set said output stage in said first condition thereof and effective when placed in a second state to set said output stage in an alternative condition wherein it responds to the amplifier output signal,

and control means for causing said first switching means and said second switching means to operate in a timed relationship such that said second switching means is in its first state at the time when said fist switching means changes from its first state to its second state, whereby said output stage assumes its first condition during the time when a transient signal is being generated by interruption of the biasing connection in such amplifier and thereafter assumes an alternative condition responsive to the amplified difference signal at a time when said transient signal does not exist.

4,028,559

REGENERATIVE REPEATER CIRCUIT ARRANGEMENT FOR USE IN DIGITAL DATA TRANSMISSION SYSTEMS

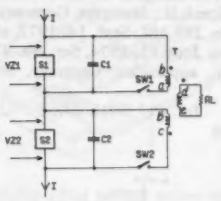
Douglas Stanley Larner, Maidenhead, England, assignor to Plessey Handel und Investments A.G., Switzerland

Filed Jan. 9, 1976, Ser. No. 647,733

Claims priority, application United Kingdom, Jan. 10, 1975, 1047/75

Int. Cl.² H03K 17/64

U.S. Cl. 307—246 3 Claims



1. A transformer-coupled bi-polar pulse generating output stage for use in a digital data line transmission regenerative repeater generating half-width output pulses from a line-powered constant current power feed, said output stage comprising;

an output transformer having two primary windings and a secondary winding, the secondary winding connecting the output stage to the digital data line,

a pair of pulse generating switching device means for generating bi-polar pulses, each switching device means connected in series with a separate one of said primary windings,

a pair of reservoir capacitors, each reservoir capacitor connected in parallel with a separate primary winding and switching device means series circuit,

means for connecting each of said reservoir capacitors in series so that the reservoir capacitors are charged in series by the constant current power feed, and

means for stabilising a voltage drop across each primary winding and switching device means series circuit, comprising a pair of shunt stabiliser devices each connected in parallel with a separate reservoir capacitor.

4,028,560

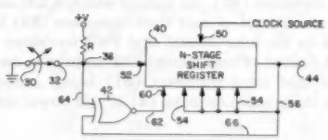
CONTACT BOUNCE TRANSIENT PULSE CIRCUIT ELIMINATOR

James R. Bainter, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 439,503, Feb. 4, 1974, abandoned. This application Oct. 8, 1975, Ser. No. 620,676

Int. Cl.² H03K 17/56, 5/01

U.S. Cl. 307—247 A 5 Claims



1. A circuit for eliminating contact bounce comprising:

a. a single line for transmitting input signals, said input signals comprising a first level and a second level and transient pulses associated therewith, said first and second levels being mutually distinct;

b. logic and memory circuit means having an input terminal and an output terminal, said input terminal being connected to said single line for receiving said input signal at time tO;

c. said logic and memory means being selectively responsive to said input signal for eliminating said transient pulses associated with either said first and second level and for generating a desired output signal level at time, tl, at said output terminal after a predetermined time period, T, said output signal level being representative of said input signal received at tO, where $T = tl - tO$;

d. said logic and memory circuit means further comprising a logic means and a memory means;

e. means for connecting said output terminal to said logic means and to said memory means;

f. said logic means being responsive to compare said input signals and said output signal levels for selectively generating first and second control signals;

g. means for connecting said first and second control signals to said memory means;

h. said memory means being electively responsive to said first control signal for generating and storing a representation of said input signal and transmitting said representation signal to said output terminal after said predetermined time period, T, for changing the output signal level;

i. said memory means being selectively responsive to said second control signal for maintaining said output terminal at its existing output signal level;

j. said memory means further comprising a shift register having N stages, a serial input terminal, N parallel input terminals, and a serial-parallel write mode select terminal, said serial-parallel write mode select terminal being connected to said logic means;

k. said serial-parallel write mode select terminal being responsive to said first control signal for storing and shifting said representation signal through said N stages in a serial mode for changing said output signal level; and

said serial-parallel write mode select terminal being responsive to said second control signal for writing the existing output signal level into said N stages for maintaining said output terminal at its existing output signal level.

4,028,561

FAST SWITCHING DARLINGTON CIRCUIT

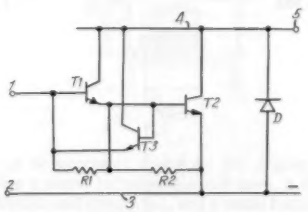
Christopher T. Black, Bedford, and Anthony Lear, Huntingdon, both of England, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 23, 1976, Ser. No. 669,585

Claims priority, application United Kingdom, Mar. 25, 1975, 12373/75

Int. Cl.² H03K 17/00

U.S. Cl. 307—300 6 Claims



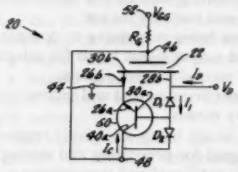
1. A fast switching darlington output circuit having a driver transistor and an output transistor in darlington connection; a first resistor connected between the base and emitter of the driver transistor; a second resistor connected from the emitter of the driver transistor to the emitter of the output transistor; and a speed-up transistor of very low gain having a collector commoned with the collectors of the driver and output transistors, a base connected to the emitter of the driver transistor and an emitter connected to the base of the driver transistor.

4,028,562

NEGATIVE IMPEDANCE TRANSISTOR DEVICE

Rainer Zuleeg, Huntington Beach, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed June 16, 1975, Ser. No. 587,093
Int. Cl.² H03K 17/60; H03B 17/00
U.S. Cl. 307—303 10 Claims



1. A transistor device providing high gain performance and exhibiting negative impedance characteristics, said transistor device comprising:

an enhancement mode insulated gate field effect transistor including a substrate region, a dielectric gate positioned over said substrate region, a source region, and a drain region which is spaced from said source region;

a bipolar transistor structurally integral with said field effect transistor and including a base, an emitter, and a collector;

a bulk region serving as said collector, said substrate region serving also as said base, and said source region serving also as said emitter;

a pn-junction located in proximity to said source and drain regions, said substrate region being separated by said pn-junction from said bulk region and left floating as said base of said bipolar transistor, and said substrate region common to said field effect and bipolar transistors causing interaction therebetween to provide said high gain performance and generate said negative impedance characteristics; and

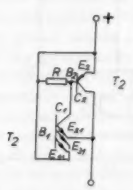
a source and emitter contact to said source region, a drain contact to said drain region, and a collector contact to said bulk region, said collector contact being normally connected to said gate.

4,028,563

INTEGRATED ZENER DIODE

Ulrich Geisler, Gundelfingen-Wildtal, Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed June 25, 1976, Ser. No. 699,751
Claims priority, application Germany, July 23, 1975, 2532847
Int. Cl.² H03K 3/26; H01L 29/72, 27/02
U.S. Cl. 307—303 7 Claims



1. An integrated zener diode, comprising:

a first forward-biased load transistor having an emitter, base and collector;

a resistor; and

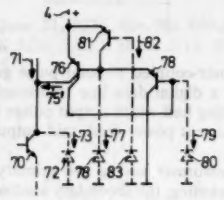
a second transistor having a collector, base and a plurality of emitters, the base of said first transistor coupled to the collector of said second transistor and, via said resistor, to the emitter of said first transistor and a first emitter of said plurality of emitters, the collector of said first transistor coupled to a second emitter of said plurality of emitters.

4,028,564

COMPENSATED MONOLITHIC INTEGRATED CURRENT SOURCE

Klaus Streit, Tubingen; Adolf Kugelmann, Leonberg, and Hartmut Seiler, Reutlingen, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Division of Ser. No. 289,161, Sept. 14, 1972, abandoned. This application June 13, 1974, Ser. No. 478,974
Claims priority, application Germany, Sept. 22, 1971, 2147179
Int. Cl.² H01L 27/06
U.S. Cl. 307—310 3 Claims



1. Monolithic integrated current source comprising:

a source of power;

a first NPN transistor (70) on a substrate (13), the emitter of which is connected to the negative terminal (2) of said power source, said first NPN transistor (70) having a trough remainder current (73); and

a compensating circuit monolithically integrated on said substrate and connected to the collector of said first NPN transister (70) to compensate said trough remainder current (73) of said NPN transistor (70), said compensation circuit comprising:

a first lateral PNP transistor (76) having two collectors, the first collector of said first lateral PNP transistor (76) being connected to the collector of said first NPN transistor (70), and the emitter of said first lateral PNP transistor (76) being connected directly to the positive terminal (4) of said power source;

a second PNP transistor (78), the emitter of said second PNP transistor (78) being connected to the base of said first lateral PNP transistor (76), the base of said second PNP transistor (78) being connected to the second collector of said first PNP transistor (76), and the collector of the second PNP transistor (78) being connected to said substrate (13); and

a third PNP transistor (81), the base of which is left unconnected, the collector of said third transistor (81) being connected to the base of said first PNP transistor (76) and to the emitter of said second PNP transistor, and the emitter of said third transistor (81) being connected directly to the positive terminal (4) of said power source.

4,028,565

SEMICONDUCTOR VISIBLE IMAGE STORAGE DEVICE

Kenneth L. Davis, Fairfax, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 27, 1975, Ser. No. 591,191
Int. Cl.² H01L 27/20, 31/00
U.S. Cl. 307—311 10 Claims

1. An optical storage system comprising:

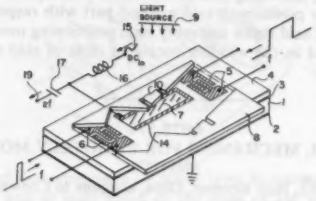
a semiconductor substrate having first and second surfaces;

a metal film deposited over the first surface and coupled to ground;

an insulating layer deposited over the second surface;

a piezoelectric semiconductor layer deposited over the surface of the insulating layer having a resistivity enabling the storage of charge patterns;

a semitransparent electrode layer coupled to the surface of said piezoelectric semiconductor layer;



means for applying a bias voltage across said electrode and ground; and

means for projecting an optical image through said semitransparent electrode such that a charge pattern is injected and stored in said piezoelectric layer causing a corresponding accumulation or depletion of charge in said semiconductor substrate.

4,028,566

ELECTROACOUSTIC CONVERSION DEVICE HAVING A DIAPHRAGM COMPRISING AT LEAST ONE OF A PIEZOELECTRIC POLYMER MATERIAL

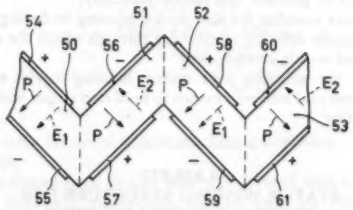
Nico Valentinus Franssen, Eindhoven, and Frans Josef Maria Frankort, Bocholtz, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 23, 1976, Ser. No. 660,696

Claims priority, application Netherlands, Mar. 3, 1975, 7502453

Int. Cl.² H01L *41/04*

U.S. Cl. 310—9.5 **10 Claims**



1. A device for converting an electric voltage into acoustic vibrations and vice versa comprising, a diaphragm including at least one layer of a piezo-electric polymer material which is polarized in a transverse direction and which at either side is provided with electrodes, the diaphragm being undulated in at least one orthogonal section, characterized in that each flank of the undulation is polarized in the same direction over its entire width, and in the operating condition the direction of the applied electric field is alternately parallel and anti-parallel relative to the polarizing directions in adjacent flanks.

4,028,567

ELECTROMAGNETIC VIBRATION-DETECTOR DEVICE, IN PARTICULAR FOR ANTI-THEFT PURPOSES

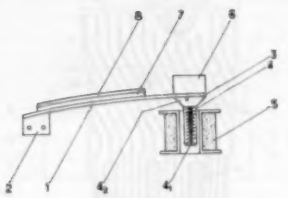
Jean Maillot, Paris, France, assignor to Paulette Guterman, Gif sur Yvette, France

Filed Apr. 9, 1976, Ser. No. 675,513

Claims priority, application France, Dec. 23, 1975, 75.39550

Int. Cl.² H02K *35/06*

U.S. Cl. 310—25 **8 Claims**



1. An electromagnetic vibration-detector device for anti-theft purposes, comprising a winding, a plunger core in the interior of the winding, a vibrating blade, means for fixing the core to the free end of the blade with the core extending into the winding and being free to vibrate with the blade, means for rigidly securing the other end of the vibrating blade relative to the winding, a thickness of cellular material, and means for securing the cellular material on at least one of the faces of the blade, said thickness of cellular material comprising on its free face a sheet of flexible material.

4,028,568

AC GENERATOR FOR VEHICLES

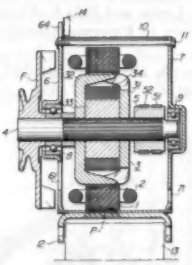
Hideo Tatsumi, Mito, and Yasushi Ohuchi, Katsuta, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 29, 1975, Ser. No. 626,991

Claims priority, application Japan, Oct. 30, 1974, 49-124470

Int. Cl.² H02K *15/16*

U.S. Cl. 310—42 **3 Claims**



1. In an ac generator driven by the engine of a vehicle comprising a stator including a stator core, a stator winding wound around said stator core, and a stator frame surrounding said stator core, and a rotor including rotary magnetic poles and a field winding and rotatably supported within said stator frame, the improvement wherein said stator frame comprises

a pair of steel plate end covers and a steel plate cylindrical casing confined between said steel plate end covers, and further comprising

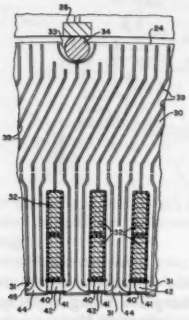
a U-shaped generator mounting seat affixed to said stator frame and wherein

said stator core, end covers, cylindrical casing and U-shaped seat are welded together as an integral unit.

4,028,569
VENTILATION SYSTEM FOR DYNAMOELECTRIC MACHINES

Raymond A. Towne, Penn Hills, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 16, 1975, Ser. No. 587,766
Int. Cl.² H02K 3/24
U.S. Cl. 310—64 7 Claims

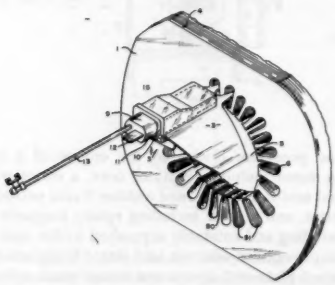


1. A dynamoelectric machine having a stator member and a rotor member separated by an air gap, said rotor member having salient poles and a ventilation system sealed off from the air gap, said stator member including a cylindrical stator core having a central bore with teeth extending longitudinally of said bore to form slots, a plurality of longitudinally spaced vent ducts extending radially through the core, stator windings disposed in said slots, means including two radially spaced members extending through each of the slots for defining longitudinal ducts extending through the slots adjacent the air gap and communicating with said radial vent ducts, means for sealing said longitudinal ducts and radial vent ducts from the air gap, and means for causing ventilating gaseous fluid to flow radially in said vent ducts and longitudinally in said longitudinal ducts from one vent duct to the next.

4,028,570
SELF LOCKING MOLDED THERMOSTAT STRAP

Vernon E. Kieffer, St. Louis, and Billy L. Damon, Manchester, both of Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Filed June 18, 1975, Ser. No. 587,823
Int. Cl.² H02K 11/00
U.S. Cl. 310—68 C 11 Claims



1. A device for use in a motor having a stator assembly, said stator assembly including a core having a plurality of winding receiving slots formed in it, comprising:

a molded part having at least one side wall defining a receptacle well in the molded part, the molded part having a main body area, said receptacle well being located in said main body area;

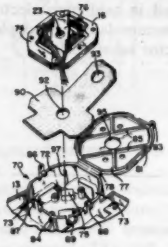
means for releasably locking a protecting device in said receptacle well including at least one locking tab integrally formed along said main body area, said locking tab being mounted for movement between a first position for holding the protecting device in said receptacle well, and a second position for releasing the protecting device, said locking tab being biased toward said first position; and

means for positioning said molded part with respect to the slots of said stator assembly, said positioning means being inserted in the winding receiving slots of said stator assembly.

4,028,571
CONTROL MECHANISM FOR REMOTELY MOUNTED MOTOR

Paul A. Dicke, New Bremen, Ohio, assignor to Crown Controls Corporation, New Bremen, Ohio

Filed Feb. 25, 1976, Ser. No. 661,319
Int. Cl.² H02K 5/04
U.S. Cl. 310—89 9 Claims



1. In a control mechanism for a remotely mounted motor comprising

a housing containing an indicator motor, an indicator dial rotatable by said motor, switch means, and a dial assembly for operating said switch means to control the direction of rotation of said motor,

the improvement characterized by

said housing including a base member and a cover,

a motor housing integrally molded within said base member and including

upwardly extending side wall means for orienting and holding said motor in place,

interior bosses for supporting the weight of said motor and to position said motor vertically,

a cover member for said motor housing including means therein defining an opening through which the shaft of said motor extends, and

means for securing said motor housing cover member against said side wall means to hold said motor within said housing.

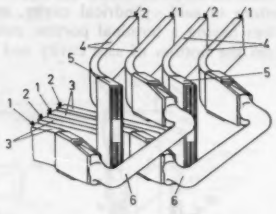
4,028,572
STATOR WINDING STRUCTURE FOR DYNAMO-ELECTRIC MACHINE

Kurt Baltisberger, Birr, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed May 7, 1975, Ser. No. 575,151
Claims priority, application Switzerland, May 20, 1974, 6855/74
Int. Cl.² H02K 3/04
U.S. Cl. 310—201 3 Claims

1. A stator winding arrangement for a polyphase synchronous electrical machine of the pole-changeable type comprising first and second windings encased within each other and distributed in alternation in upper and lower layers in the

stator slots, the respective pitches of said windings differing by an even number of slots, each said winding being composed of rigid conductor rods and including axially projecting ends to be interconnected, at least some of the ends of the rods of said first winding in a lower layer being connected to the ends of



the rods of that winding in an upper layer by means of straight eye rods and at least some of the ends of the rods of said second winding in a lower layer being connected to the ends of the rods of that winding in an upper layer by means of oblique eye rods located axially outward from and which extend around said straight eye rods.

4,028,573

ROTOR FOR AN ELECTRICAL MACHINE

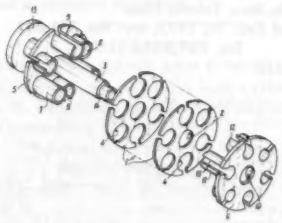
Andre Terrone, Romans, France, assignor to Societe Anonyme des Equipements S.E.I.M., Romans, France

Filed Apr. 26, 1976, Ser. No. 680,169

Claims priority, application France, Apr. 29, 1975, 75.14050

Int. Cl.² H02K *1/06*

U.S. Cl. 310—217 **10 Claims**



1. A rotor for an electrical machine comprising:

a shaft;

a first flange fixed to said shaft and formed with a plurality of angularly equispaced notches opening toward the periphery of said first flange;

a stack of ferromagnetic sheets on said shaft resting with one side against said first flange and having notches aligned with the notches of said first flange; and

a second flange elastically locked to said shaft and engaging the opposite side of said stack while being formed with a plurality of notches aligned with the notches of said stack, said flanges being formed on their faces turned toward said stack with axially extending alternately long and short hollow lugs received in the notches of said stack, the long hollow lugs of one of said flanges being aligned with the short hollow lugs of the other of said flanges.

4,028,574

SYNCHRONOUS MOTOR STRUCTURE INCORPORATING ROTOR HAVING SOLID POLES

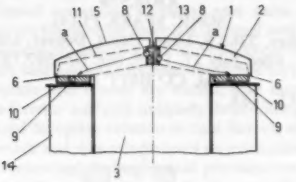
Muzaffer Canay, Birr, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Mar. 20, 1975, Ser. No. 560,529

Claims priority, application Switzerland, Apr. 1, 1974, 4497/74

Int. Cl.² H02K *1/24*

U.S. Cl. 310—269 **8 Claims**



1. A synchronous motor structure having a rotor component comprising a longitudinally extending central body portion, a plurality of solid poles extending outwardly from said body portion, each said pole including a shank terminating at its inner end in a claw connection by means of which said pole is secured to said central body portion and a pole shoe located at its outer end, conductor rods extending respectively in a longitudinal direction along opposite sides of said pole below said pole shoe from one end of the pole to the other and thence across opposite ends of the pole towards the center, said conductor rods together with the surface portion of said pole shoe forming single turn quadrature windings providing closed loop conductive paths confined to the pole for currents induced along the pole surface by the time-variable quadrature-field and which causes said currents to close around the quadrature-field, said quadrature windings also forming circuits parallel to the surfaces of said pole which thereby improves the asynchronous torque of the motor at low slip rates and reduces the oscillating torque.

4,028,575

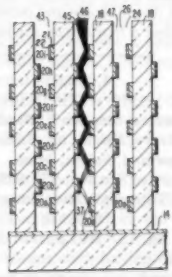
ELECTRON MULTIPLIER IMAGE DISPLAY DEVICE

John A. van Raalte, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 28, 1975, Ser. No. 636,042

Int. Cl.² H01J *43/20*, *43/10*, *31/48*

U.S. Cl. 313—105 R **11 Claims**



1. An addressable video line generator for a flat image display device comprising:

a substrate;

a planar electron source on one surface of said substrate;

a plurality of substantialy parallel, planar, area electron multipliers on said one surface of said substrate in substantially orthogonal spaced relation to said planar elec-

tron source, each multiplier comprising a substantially linear output aperture and a plurality of dynode members between said electron source and said output aperture for multiplying and controlling the flow of a substantially linear electron beam therebetween, at least one of said dynode members being addressable; and

control means for applying an accelerating voltage or an inhibiting voltage to each addressable dynode member and accelerating voltages to the remaining dynode members in response to a control signal.

4,028,576

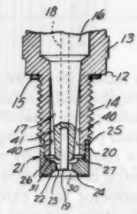
SONIC SPARK PLUG

David Wofsey, 3368 S. Ulster Court, Denver, Colo. 80231

Filed July 21, 1975, Ser. No. 597,753

Int. Cl.² H01T *13/20*

U.S. Cl. 313—143 **7 Claims**



1. A spark plug comprising a generally tubular conductive main body having a hollow conductive lower end portion exteriorly threaded to engage in an engine block, said hollow end portion having an inwardly projecting rib with a cylindrical inner surface, an insulator axially secured in said main body and having a lower end extending into said hollow end portion, an electrode axially secured in said insulator and having an exposed cylindrical rod-like portion positioned within the space defined by said cylindrical inner surface whereby a ring-like firing space is formed, said hollow end portion being provided with an acoustic cavity above said firing space, defining an acoustic system whose resonant frequency is proportional to the radial width of the ring-like firing space, inversely proportional to the height of the cylindrical inner surface and inversely proportional to the volume of the acoustic cavity, and the values thereof being selected to provide an acoustic resonant frequency of at least ten thousand Hertz, wherein said exposed rod-like portion extends for at least the full height of said cylindrical inner surface of said rib, and wherein said hollow end portion has an annular bottom mouth sloping downwardly and outwardly away from said firing space to define a front horn for said system.

4,028,577

ELECTRIC LAMP WITH INSULATING BASE

Paul E. Gates, Danvers; Stephen F. Kimball, Georgetown, and Stephen J. Leadvaro, Salem, all of Mass., assignors to GTE Sylvania Incorporated, Salem, Mass.

Continuation-in-part of Ser. No. 572,609, April 28, 1975, Pat. No. 3,979,627. This application June 23, 1976, Ser. No. 699,118

Int. Cl.² H01J *5/48, 5/50*

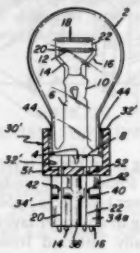
U.S. Cl. 313—318 **10 Claims**

1. An electric lamp comprising, in combination:

an hermetically sealed, light-transmitting envelope containing an energizable source of light and having a sealed portion at one end;

an insulting base member having a cylindrical cavity that is larger than the sealed end portion of said envelope, a wedge-lock portion depending from the bottom of said cavity, said wedge-lock portion having opposed substantially flat sides with locating means, including a transverse lock-in rib, formed on each of said opposed flat sides, and a plurality of channels passing through the bottom of said cylindrical cavity, said sealed end portion of the envelope being secured within said base cavity; and

a plurality of lead-in wires extending through the sealed end portion of said envelope and into the respective channels in the bottom of said cylindrical cavity, each of said lead-in wires having a terminal portion extending outwardly from the bottom of said cavity and proceeding



alongside said wedge-lock portion from the top to the bottom thereof, the terminal portion of at least a first one of said lead-in wires extending alongside and approximately parallel to one of said flat sides past the transverse lock-in rib thereon and engaging the bottom of said wedge-lock portion, and the terminal portion of at least a second one of said lead-in wires extending alongside and approximately parallel to the other of said flat sides past the transverse lock-in rib thereon and engaging the bottom of said wedge-lock portion.

4,028,578

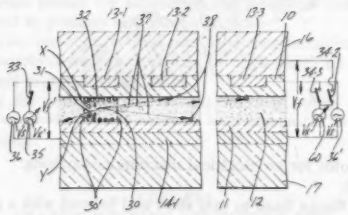
GAS DISCHARGE DIELECTRIC CONTAINING A SOURCE OF BORON, GALLIUM, INDIUM, OR THALLIUM

Bernard W. Byrum, Jr.; Michael E. Fein, both of Toledo, and Roger E. Ernsthausen, Luckey, all of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 16, 1973, Ser. No. 333,091

Int. Cl.² H01J *61/35*

U.S. Cl. 313—221 **20 Claims**



5. In a multiple gaseous discharge display/memory panel having an electrical memory and capable of producing a visual display, the panel being characterized by an ionizable gaseous medium in a gas chamber formed by a pair of opposed dielectric material charge storage members, each of which dielectric members is respectively backed by an array of electrodes, the electrodes behind the opposing dielectric member being oriented with respect to the electrodes behind the opposing dielectric member so as to define a plurality of discrete discharge units, the improvement wherein at least one dielectric member contains a layer of an oxide of gallium.

4,028,579

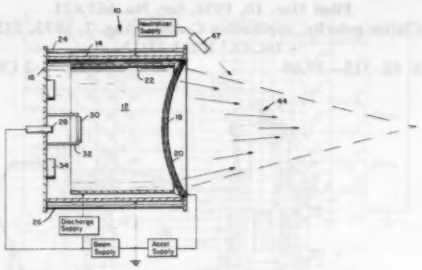
HIGH CURRENT DENSITY ION SOURCE

Harry J. King, Woodland Hills, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 516,718, Oct. 21, 1974, abandoned. This application June 29, 1976, Ser. No. 701,000

Int. Cl.² F03H 5/00; H05H 5/02

U.S. Cl. 313—361 **8 Claims**



7. An ion source comprising:

an electron bombardment discharge chamber for producing ions of a selected species, said chamber being defined at its outlet by a screen electrode having a plurality of openings therein;

an accelerator electrode positioned adjacent said screen electrode on the opposite side thereof from said discharge chamber, said accelerator electrode having openings therein, said accelerator electrode being connectable to a source of accelerating electric potential so that ions passing through openings in said screen electrode form individual ion beamlets which pass through corresponding openings in said accelerator electrode; and wherein the improvement comprises:

means for positioning said openings in said screen and accelerator electrodes with respect to each other so that said beamlets are each individually directed toward a downstream location to form a selected shaped beam cross section of smaller cross-sectional area at a location downstream from said accelerator electrode than the area at said accelerator electrode to produce a beam at the downstream location having higher current density than at said accelerator electrode.

4,028,580

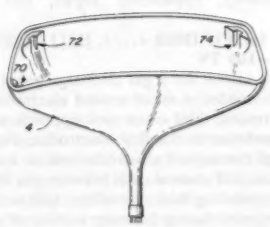
SHADOW MASK MOUNT AND FUNNEL-FACEPLATE REFERENCING SYSTEM FOR COLOR CRT

Lawrence W. Dougherty, West Dundee, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Nov. 25, 1974, Ser. No. 527,001

Int. Cl.² H01J 29/07, 31/20

U.S. Cl. 313—406 **3 Claims**



1. In a rectangular-type color cathode ray tube, the combination comprising:

an approximately rectangular, curved, flangeless faceplate having studs embedded in the four corners thereof and extending from a common concave inner surface of said faceplate, said studs each having a channel shape with a face section flanked by a pair of radially outwardly extending flanges, said studs each having a first end portion embedded in said faceplate and a second portion extending from the faceplate, said second portion having provision in said face section for coupling said stud to a shadow mask, said flanges of said stud constituting spaced faceplate reference surfaces;

a funnel having an approximately rectangular mouth sealed to said faceplate and provided in each of three corners of the mouth in registry with three of said studs, a pair of inside funnel reference surfaces, said pairs of funnel reference surfaces being oriented, located and spaced so as to respectively capture and make referencing engagement with said pairs of faceplate reference surfaces when the faceplate and funnel are mated, said faceplate and funnel reference surfaces uniquely determining the location of said faceplate relative to said funnel; and

a shadow mask and mounting means on each corner of said mask for retentively engaging said provision on said studs such that said mask is supported adjacent said faceplate inner surface.

4,028,581

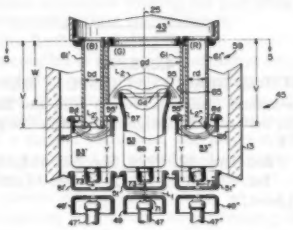
PLURAL BEAM ELECTRON GUN ASSEMBLY

Michael G. Stratton, Seneca Falls, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed June 24, 1976, Ser. No. 699,441

Int. Cl.² H01J 29/50, 29/51

U.S. Cl. 313—414 **9 Claims**



1. A modified cathode ray tube three beam in-line bi-potential electron gun assembly having a longitudinal axis therethrough and including electron generating means formed to emit said respective beams of substantially differing current levels in a substantially common plane coextensive with said axis, said beams being directed from a center and two side-related guns to selectively impinge a spatially related patterned electron responsive screen, said electron gun assembly comprising in sequential order:

cathode means oriented in a common plane;

apertured control electrode means associated with said cathode means oriented in a common plane spatially related thereto;

apertured initial accelerator means positioned adjacent said control electrode means with the apertures thereof being in a common plane proximal to the apertures of said control electrode means;

focusing electrode means each having front and rear apertures with defined electrode lengths therebetween, said rear apertures being in common plane adjacent related apertures of said initial accelerator means, at least one of said focusing electrodes being an alpha member having a front aperture defined by a protruding tubular member having a diameter larger than that of the front apertures of the adjacently related beta focusing electrode members and having a definitive length greater than that of

said beta members to provide an increased object focal length for said alpha focusing electrode, said front alpha aperture being in a plane forward of the respective plane of said related front beta apertures; and

final accelerator means in the form of three in-line cylindrical electrode members each having front and rear apertures with definitive electrode lengths therebetween, said front apertures being in a common plane whereupon a cup-like terminal member is affixed, said cylindrical electrode members being substantially tube-like structures exhibiting at least differing delta and theta diameters and at least differing delta and theta definitive lengths thereby effecting the positioning of the respective rear delta and theta apertures in two parallel planes relative to the respective planes of the front apertures of said alpha and beta focusing electrodes, said delta accelerator member being the shortest in length and evidencing the largest apertural dimension such being larger than that of the related alpha protruding focusing electrode, the terminal portion of said alpha protruding focusing member being spatially and ingressively positioned slightly within the apertural opening of the larger delta accelerator member to provide a partial telescoping arrangement for effecting the forming and shielding of a large focusing lens substantially encompassed within said delta accelerator electrode thereby providing efficient focusing of the beam of highest current level, said side-positioned theta accelerator electrodes being longer cylindrical constructions evidencing rear apertured diameters smaller than said related front apertures of said related beta focusing electrodes wherein said respective theta accelerator members are ingressively oriented to provide a partial telescoping arrangement for effecting the forming and shielding of smaller focusing electrodes thereby providing focusing of the beams of lower current levels.

4,028,582

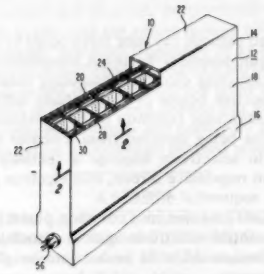
GUIDED BEAM FLAT DISPLAY DEVICE

Charles Hammond Anderson, Rocky Hill, and Stanley Bloom, Plainfield, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Sept. 22, 1975, Ser. No. 615,353

Int. Cl.² H01J *29/72, 29/08, 31/00*

U.S. Cl. 313—422 **17 Claims**



1. An electron display device comprising

an evacuated envelope having a substantially flat front wall,

a phosphor screen along the inner surface of said front wall,

means in said device for generating a beam of electrons and directing said beam in a first path generally parallel to and across said phosphor screen,

means along said first beam path for selectively deflecting said beam out of said first path at selected points along said first path into a second path extending toward said phosphor screen so that the beam will impinge on said phosphor screen, and

means along said second path for deflecting said beam in a plane transverse to said first path of the beam so that the beam will scan at least a portion of the phosphor screen.

4,028,583

HIGH POWER-DOUBLE STRAPPED VANE TYPE MAGNETRON

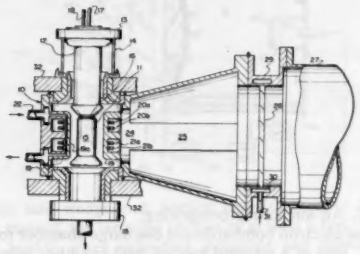
Clifford B. Bigham, Deep River, Canada, assignor to Atomic Energy of Canada Limited, Ottawa, Canada

Filed Mar. 10, 1976, Ser. No. 665,621

Claims priority, application Canada, Aug. 7, 1975, 233018

Int. Cl.² H01J *23/22*

U.S. Cl. 315—39.69 **2 Claims**



1. A high power double-strapped, vane-type magnetron comprising:

a. an evacuated housing,

b. an anode structure mounted in the housing and formed of an even number of vanes defining resonant cavities therebetween and at least one pair of circumferential straps passing through openings in the vanes with the straps connected in interleaved relation to alternate vanes, said vanes having cooling channels therein directly behind the anode surface to be bombarded by electrons,

c. a cathode structure mounted centrally of said anode, said cathode structure comprising a secondary emission cathode surface and a separate starting filament mounted thereon,

d. a coupling slot connecting one of said resonant cavities via a ridged waveguide transition and a window to an output waveguide, and

e. means for applying an axial magnetic field in the region between the anode and cathode.

4,028,584

DRIVING CIRCUIT FOR SELECTING CONTROL CELLS OF A GAS DISCHARGE PANEL BY TRANSISTORS THROUGH DIODES

Masamichi Shutoh, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Sept. 17, 1975, Ser. No. 614,188

Claims priority, application Japan, Oct. 18, 1974, 49-120508

Int. Cl.² H05B *41/14;* **H01J** *65/00*

U.S. Cl. 315—169 TV **7 Claims**

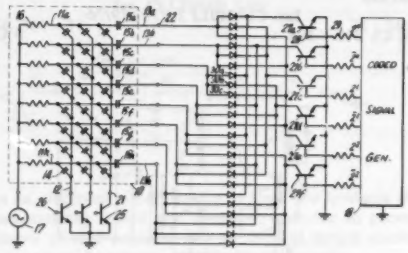
1. A driving circuit for a gas discharge panel comprising a set of first electrodes, a set of second electrodes opposite to the first electrodes, third electrodes opposite and in one-to-one correspondence to the first electrodes, display cells between each of the second electrodes and at least one of the first electrodes, and control cells between the first electrodes and the corresponding third electrodes, said second and third electrodes disposed facing the same surface of said first electrodes, said circuit comprising;

a plurality of first terminals connected to the second electrodes,

a plurality of second terminals connected to the third electrodes,

a group of first switching elements connected to said first terminals,

a plurality of directional circuit elements connected to said second terminals, said directional circuit elements being greater in number than said second terminals, and a plurality of second switching elements connected to said directional circuit elements, the number of said second switching elements being smaller than the number of said second terminals wherein:



a predetermined number of said directional circuit elements are connected to each of said second terminals, and

said second switching elements are divided into said predetermined number of subgroups, the directional circuit elements connected to each of said second terminals being connected to one of said second switching elements of the respective subgroups thereof.

4,028,585

CIRCUIT FOR GENERATING A CORRECTION CURRENT FOR CORRECTING FOR DEFLECTION ERRORS ON THE DISPLAY SCREEN OF A COLOR TELEVISION DISPLAY TUBE

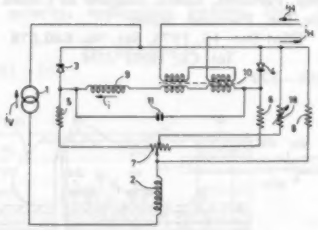
Adrianus Hubertus Kantelberg, and Leonardus Albertus Antonius Valkestijn, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 11, 1976, Ser. No. 665,954

Claims priority, application Netherlands, Mar. 27, 1975, 7503666

Int. Cl.² H01J *29/56*

U.S. Cl. 315—371 **9 Claims**



1. A circuit for use with vertical deflection coil having a core and an auxiliary winding means disposed on said core for generating a magnetic quadripolar field substantially in the deflection plane, said circuit comprising an output amplifier means for supplying a deflection current of field frequency to said deflection coil for deflecting in the vertical direction at least one electron beam generated in a display tube, and means for correcting deflection errors of said beam without affecting said field frequency deflection current comprising the circuit being adapted to be coupled in series with the deflection coil and including a bridge circuit comprising diodes and resistors, a resistor coupled in a diagonal branch of the bridge circuit, the auxiliary winding being adapted to be coupled in the other diagonal branch.

4,028,586

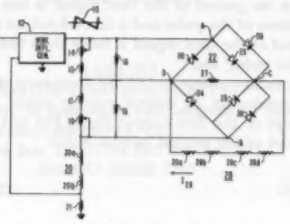
PARABOLIC CURRENT GENERATOR

Lewis Irwin Mengle, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 2, 1976, Ser. No. 654,719

Int. Cl.² H01J *29/70, 29/76*

U.S. Cl. 315—368 **4 Claims**



1. An improved parabolic current generator for providing a convergence correction current in a deflection system utilized in a display system, comprising:

a deflection generator coupled to a deflection winding for providing an alternating current sawtooth scanning waveform therein;

said parabolic current generator including a bridge circuit having its input terminals coupled in series with said deflection winding and its output terminals coupled to a convergence correction winding for providing said parabolic correction current therethrough;

said generator further including first and second impedance networks coupled in series with each other and the two of them coupled in parallel with said input terminals of said bridge, said networks each including a first fixed resistance coupled in parallel with a series coupled potentiometer and a second resistance, the junction of said networks being coupled to one of said output terminals of said bridge for allowing separate adjustment of said correction current during each polarity of said alternating current scanning waveforms and for limiting the amount of correction current flowing through said potentiometer.

4,028,587

MARKER CIRCUIT

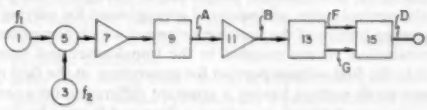
Gary Wayne Holmlund, Santa Rosa, Calif., and Toshio Ichino, Hino, Japan, assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 14, 1975, Ser. No. 567,466

Claims priority, application Japan, Sept. 6, 1974, 49-102570

Int. Cl.³ G01R *13/30*

U.S. Cl. 315—377 **6 Claims**



1. A circuit for generating a marker signal comprising:

a first input circuit for receiving a first signal;

a second input circuit for receiving a second signal;

mixing means connected to the first and second input circuit for producing a beat signal having a frequency equal to the difference between the frequencies of the first and second signals;

frequency detecting means connected to the mixing means for detecting when the frequency of the beat signal is below a predetermined threshold frequency and for producing output signals indicating whether the beat signal frequency is above or below the predetermined threshold frequency, the frequency detecting means comprising a pulse generator connected to the mixing means for producing a pulse having a duration equal to one half the period of the threshold frequency, and comparator means connected to the mixing means and the pulse generator for comparing the period of the beat signal with the duration of the pulse and for producing a first output signal when the period of the beat signal is less than twice the duration of the pulse and a second output signal when the period of the beat signal is more than twice the duration of the pulse; and

output means connected to the frequency detecting means for producing an output marker signal in response to receipt of the first output signal but not in response to receipt of the second output signal.

4,028,588

ARRANGEMENT FOR VARYING THE EXCITATION OF A DEFLECTION CIRCUIT IN RESPONSE TO LOAD CHANGES AND THE LIKE

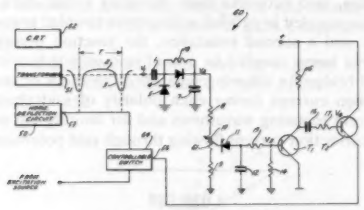
Heinz Kraus, Burggrub, Germany, assignor to Loewe-Opta GmbH., Kronach, Germany

Filed Dec. 17, 1975, Ser. No. 641,644

Claims priority, application Germany, Dec. 19, 1974, 2460014

Int. Cl.² H01J *29/70, 29/76*

U.S. Cl. 315—387 **5 Claims**



1. In an apparatus for varying the excitation of a sweep deflection circuit, the deflection circuit including a transformer exhibiting a repetitive voltage occurring at a first rate and having a first forward sweep portion and a second flyback portion, the apparatus including a thyratron-like switching element associated with the deflection circuit and responsive to a variable-phase trigger control pulse applied to a control electrode of such switching element for varying the excitation of the deflection circuit in proportion to changes in the phase of the control pulse, an improved arrangement for varying the triggering instant of the switching element which comprises, in combination, means coupled to the transformer and responsive to the first voltage portion for generating, at the first rate, a saw-tooth voltage having a constant difference between its maximum and minimum voltage values and further having an effective variable DC component instantaneously proportional to the amplitude of the then-occurring first voltage portion, means coupled to the sawtooth voltage generating means for generating a constant-amplitude control pulse at the instant when the sawtooth voltage exceeds a predetermined amplitude, and means for applying the control pulse to the control electrode of the switching element.

4,028,589

CIRCUIT ARRANGEMENT IN A TELEVISION RECEIVER, PROVIDED WITH A LINE DEFLECTION CIRCUIT AND A SWITCHED SUPPLY VOLTAGE CIRCUIT

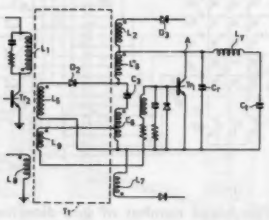
Oswald Johannes Verbeij, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 21, 1976, Ser. No. 651,197

Claims priority, application Netherlands, Feb. 5, 1975, 7501339

Int. Cl.² H01J *29/70, 29/76*

U.S. Cl. 315—408 **3 Claims**



1. A circuit arrangement for use with a television line deflection coil, said circuit arrangement comprising a first switch controllable at the line frequency and a first winding, coupled to said first switch, a supply voltage circuit means also switched at the line frequency for controlling said first switch comprising a second switch controllable at the line frequency and a second winding coupled to said second switch, a first current loop comprising the first winding, a third winding coupled to the second winding, a diode conducting during the cut-off time of the second switch and a capacitor, and a second current loop which comprises a fourth winding coupled to the first winding and a fifth winding coupled to the third winding.

4,028,590

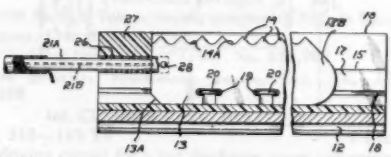
ANTI-STATIC BAR

Peter Bishop, Portland, Maine, assignor to United Industrial Syndicate, Inc., Portland, Maine

Filed Dec. 15, 1975, Ser. No. 640,578

Int. Cl.² H05F *3/04*

U.S. Cl. 361—220 **12 Claims**



1. An anti-static bar including a supporting member having a lengthwise channel, a conductor in the form of a thin metal strip having a serrated edge, insulating means within said channel and secured to said member, means connecting said serrated conductor in said insulating means with said conductor extending lengthwise of said channel parallel to but between the side walls of the member with its serrated edge protruding from said insulating means and exposed adjacent the edges of said walls to provide a series of discharge points, and a cable attached to said member with its conductor connected to the serrated conductor.

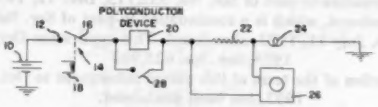
4,028,591
RELAY CONTACT PROTECTOR

David Kahn, Harrisburg, and Howard Richard Peiffer, New Cumberland, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 399,643, Sept. 21, 1973, abandoned, which is a continuation-in-part of Ser. No. 351,716, April 16, 1973, abandoned. This application Oct. 22, 1975, Ser. No. 624,810

Int. Cl.² H02H 3/00

U.S. Cl. 361—11 21 Claims



1. In an electrical circuit having at least two contacts that are systematically mated and unmated, a device to prevent breakdown of said contacts due to current surges causing arcing across said contacts, said device comprising:

a polyconductive member formed of material having a negative temperature-resistance characteristic such that its resistance at temperatures below a predetermined critical temperature is at least several orders of magnitude larger than its resistance at temperatures above the critical temperature; and

means connecting said polyconductor member in series with said contacts,

whereby electrical current passing through the polyconductive material initially encounters a high resistance until sufficient current passes to raise the temperature of the polyconductive material by Joule effect heating to above the critical temperature after a predetermined time period sufficient to allow said contacts to stop bouncing and achieve a stable mated state after which full current is allowed to pass maintaining said polyconductor heated above the critical temperature.

4,028,592
MEANS FOR INCREASING THE STABILITY IN HIGH-VOLTAGE POWER SUPPLY NETWORKS

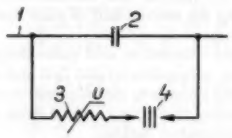
Nils Fahlen, Vasteras, and Asle Schei, Ludvika, both of Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden

Continuation of Ser. No. 148,110, Nov. 21, 1973, abandoned. This application Dec. 24, 1974, Ser. No. 536,227

Claims priority, application Sweden, Dec. 22, 1972, 16863/72

Int. Cl.² H02H 7/16

U.S. Cl. 361—16 4 Claims



1. Series capacitor bank for achieving an uninterrupted stabilization of the condition of operation in high-voltage electric power supply networks with a capacitor, and a back-up safety circuit connected in parallel with the capacitor, said safety circuit including means responsive to disturbances of a magnitude which causes overvoltages which may damage the capacitor to short-circuit the capacitor, comprising a first current path in parallel with the capacitor and said safety circuit, said first current path including a spark gap in series with a voltage-dependent resistor for controlling the current through the current path in dependence on the voltage across the capacitor, said resistor means having a very high resistance as long as the voltage across the capacitor is below a predetermined value which is dependent on the electric properties of the capacitor, said value being higher than the operating voltage of the capacitor but lower than the voltage at which said safety circuit becomes effective and short-circuits the capacitor, the resistance of the resistor means decreasing for voltages exceeding said predetermined value, whereby said capacitor is not short-circuited by said safety circuit with voltages between said operating voltage and said predetermined voltage.

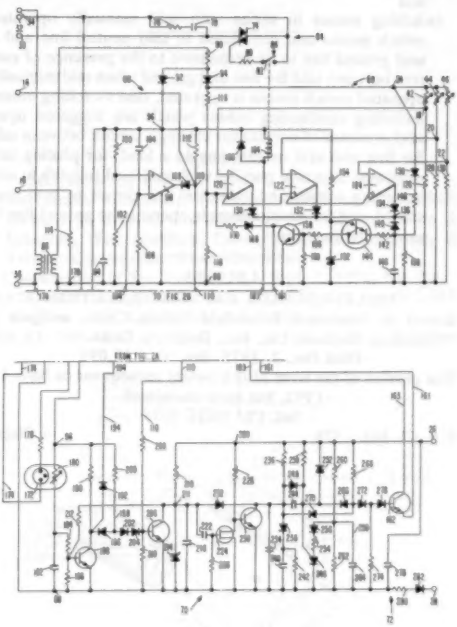
4,028,593
MOTOR CONTROL CIRCUIT

Dennis E. Newell, El Segundo, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Jan. 15, 1976, Ser. No. 649,291

Int. Cl.² H02H 7/08

U.S. Cl. 361—27 21 Claims



1. In a control circuit for controlling a motor usable in a refrigeration system, the combination comprising

relay means to selectively energize the motor,

first and second transistors both connected to the relay means so that each can inhibit its operation,

a temperature responsive circuit responsive to the temperature inside the motor to cause the first transistor to inhibit operation of the relay means in the event of a high temperature condition,

a delay after break timer to cause the second transistor to inhibit relay means operation for a predetermined period after any shut down of the motor,

a refrigerant pressure responsive circuit to trigger the delay after break timer if the refrigerant pressure is insufficient, and

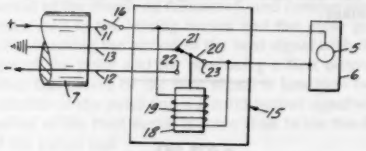
a lock-out circuit responsive to actuation of the temperature responsive circuit or the refrigerant pressure responsive circuit to cause the second transistor to inhibit relay means operation following a fault condition.

4,028,594

SAFETY CIRCUIT FOR ELECTRICAL EQUIPMENT

George W. Schossow, 2316 Lilac Lane, White Bear Lake, Minn. 55110

Filed Nov. 7, 1975, Ser. No. 629,793
Int. Cl.² H02H 3/14
U.S. Cl. 307—326 **11 Claims**



1. A safety circuit for use with appliances having a load and a three wire cord having a plug, a B+ line, a neutral line, and a ground line, said circuit comprising

manually operated switch means in series with said B+ line for closing a circuit upon operation of said switch means, and

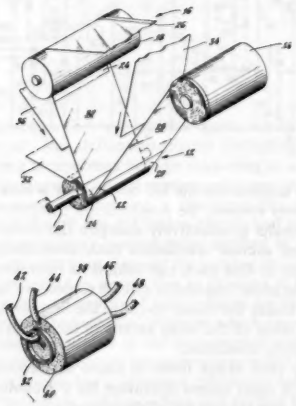
switching means in series with said manually operated switch means and connected to said neutral line and a said ground line to be responsive to the presence of current between said B+ line and ground when said manually operated switch means is operated, said switching means including conducting means which are triggered upon said presence of current for closing a circuit between said B+ line and said neutral line to a load, for placing said switching means in parallel with said load to latch in said switching means and maintain the circuit to said load closed, and for simultaneously opening the ground line to said switching means.

4,028,595

MULTI-VOLTAGE CAPACITOR SECTION

Robert M. Stockman, Brookfield Center, Conn., assignor to American Radionic Co., Inc., Danbury, Conn.

Filed Dec. 2, 1975, Ser. No. 637,091
The portion of the term of this patent subsequent to Nov. 18, 1992, has been disclaimed.
Int. Cl.² H01G 4/38
U.S. Cl. 361—328 **6 Claims**



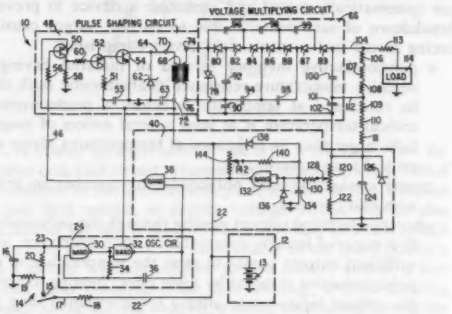
1. A capacitor section comprising: first and second dielectric strips wound together in cylindrical form; first and second conductive plates separated by said first and second dielectric strips, at least one of said plates being interrupted across its length to thereby form at least two electrical capacitors; a non-conductive sheet inserted between said strips and extending outwardly from a first end of said section adjacent said interrupted length to form a circular barrier separating the interrupted portions of said one plate; and supplemental third and fourth dielectric strips adjacent said first and second dielectric strips in one of said capacitors whereby said two capacitors have different voltage ratings.

4,028,596

CORONA POWER SUPPLY CIRCUIT

Harold J. Weber, Sherborn, Mass., assignor to Coulter Information Systems, Inc., Bedford, Mass.

Continuation-in-part of Ser. No. 532,713, Dec. 12, 1974, abandoned, which is a continuation-in-part of Ser. No. 378,136, July 11, 1973, abandoned. This application Oct. 20, 1975, Ser. No. 623,903
The portion of the term of this patent subsequent to Oct. 12, 1993, has been disclaimed.
Int. Cl.² G03G 15/00
U.S. Cl. 361—235 **25 Claims**



1. A portable power supply for producing a high corona output when coupled to a D.C. power source including in combination:

oscillator means operative to develop first oscillations;

control means coupled to said oscillator means and operative to develop second oscillations in response to said first oscillations and a corona signal indicating a corona output below a predetermined level;

pulse-shaper means coupled to said control means and operative to develop a first voltage pulse having one polarity in response to a first half of each cycle of said second oscillations and to develop a second voltage pulse having the opposite polarity in response to the second half of each cycle of said second oscillations, said pulse-shaper means being operative to draw substantially all operating current during said first half of each cycle of said second oscillations and substantially no operating current during the second half of each cycle of said second oscillations;

multiplier means coupled to said pulse-shaper means and operative only in response to said first and second voltage pulses coupled thereto to develop said corona output;

means for coupling said corona signal from said multiplier means to said control means.

4,028,597

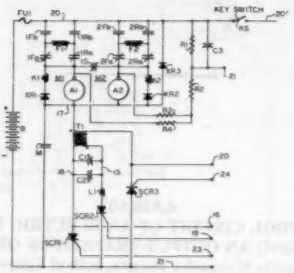
MOTOR CONTROL SYSTEMS

Michael J. Delaney, Greene, and Hiram G. Gilbert, Binghamton, both of N.Y., assignors to The Raymond Corporation, Greene, N.Y.

Filed July 12, 1974, Ser. No. 487,890
Int. Cl.² H02P 3/00
U.S. Cl. 318—87 **30 Claims**

1. A battery-powered vehicle comprising a base mounted on a pair of non-steerable drive wheels and having a steering wheel; first and second series-field direct-current motors con-

nected to drive respective ones of said drive wheels at mutually relative speeds dictated by the positioning of said steering wheel; first directional contactor means for connecting power from a first circuit terminal through the field of said first motor to a first terminal of the armature of said first motor, second directional contactor means for connecting said first circuit terminal through the field of said second motor to a first terminal of the armature of said second motor; thyristor means and a battery connected in series between a second terminal of each of said armatures and said first circuit terminal; pulse generator means for applying pulses to said thyristor



means to turn said thyristor means on and off; timing circuit means for controlling said pulse generator means to vary the conduction duty cycle of said thyristor means; means for sensing whether said motors are being accelerated or plugged; a normally-closed contactor connected between said first terminals of said armatures; and means responsive to adjustment of an operator control and responsive to said sensing means for energizing said normally-closed contactor to open its contacts while said motors are being accelerated and for de-energizing said normally-closed contactor while either one or both of said motors are being plugged.

4,028,598

DIRECT-CURRENT MOTOR COMPRISING AN ELECTRONIC COMMUTATOR

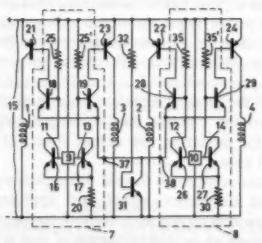
Hendrik Jan Bergmans, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 872,158, Oct. 29, 1969, abandoned. This application Jan. 7, 1974, Ser. No. 431,017

Claims priority, application Netherlands, Nov. 1, 1968, 6815585

Int. Cl.² H02K *29/02*

U.S. Cl. 318—138 **3 Claims**



1. A direct-current motor comprising a source of direct voltage, a permanent magnetic rotor, at least two stator windings, an electronic switching device haivng the same number of Hall elements energized by said direct voltage and exposed to the rotor field, at least two control transistors, means connecting the output terminals of said Hall elements individually to the base electrodes of the control transistors, means comprising a plurality of amplifying transistors for individually coupling the control transistors to corresponding stator windings so that the current through the various stator windings is controlled as a function of the position of the rotor, characterized in that the amplifying transistors form at least one group of at least two transistors, a source of substantially constant current comprising a transistor of the same conductivity type as the transistors of the associated group of amplifying transistors, means for energizing the emitter electrodes of the amplifying transistors in common from said source of substantially constant current including, means connecting the collector of said transistor to the emitters of the transistors of said group, and means connecting its emitter to one terminal of a source of forward direct voltage and its base electrode to the other terminal of said source through a resistor, whereby in any position of the rotor only one transistor of each group can be fully conducting and each winding can be fully energized over an angle of at the most 120° relative to a bipolar rotor in a given direction.

4,028,599

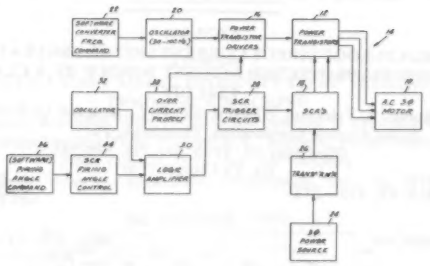
METHOD OF CONTROLLING AN A.C. MOTOR

Frank Zankl, Milwaukee; Edward E. Kirkham, Brookfield; Richard E. Stobbe, Greenfield, all of Wis., and John J. Schachte, West Hartford, Conn., assignors to Kearney & Trecker Corporation, West Allis, Wis.

Continuation of Ser. No. 285,813, Sept. 1, 1972, Pat. No. 3,878,445. This application Feb. 19, 1975, Ser. No. 551,145

Int. Cl.² H02P *7/00;* **G06B** *11/14*

U.S. Cl. 318—227 **2 Claims**

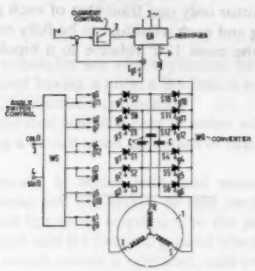


1. A method of controlling the application of power to an a.c. motor in a servo system, said motor having a plurality of stator field windings, comprising the step of electronically calculating, from a first parameter representative of motor speed and a second parameter representative of the programmed position of said motor, a quantity for the torque required of said motor and the required position of the stator field of said motor during a succeeding period to perform in accordance with said second parameter, for each calculation of said torque quantity, producing a signal at a time representative of said torque quality, using said signal to actuate at controlled rectifier to produce, from an a.c. voltage, a d.c. voltage having an amplitude representative of said torque quantity, and producing, for each calculation of said stator field position quantity, a signal for controlling application of a source of electrical power to the stator field windings of said motor to cause said stator field to assume a position adjacent to the position represented by said stator field position quantity.

4,028,600
METHOD AND APPARATUS FOR SLOW SPEED OPERATION OF AN INVERTER CONTROLLED ROTATING FIELD MACHINE

Felix Blaschke, Erlangen, and Herwig Klautschek, Furth, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Continuation-in-part of Ser. No. 381,541, Aug. 23, 1973, abandoned. This application May 15, 1975, Ser. No. 577,918
Claims priority, application Germany, Apr. 3, 1975, 2514557
Int. Cl.² H02K *17/02*; H02P *8/00*
U.S. Cl. 318—227 **16 Claims**



1. A method for controlling the impressed position of the stator current vector in a convertor driven rotating field machine, which can be energized only to provide a predefined pluraltiy of discrete vector positions, such as to avoid uneven running at low rotation speeds comprising:

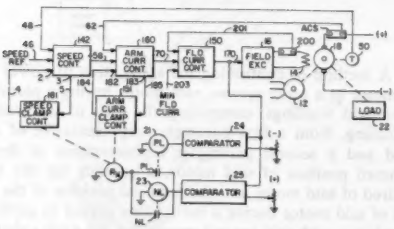
a. defining a desired impressed position of the stator current vector; and

b. alternately energizing the two discrete vector positions on each side of said desired position for relative time periods which will result in an average vector position corresponding to said desired position.

4,028,601
MULTI-LOOP DIRECT CURRENT MOTOR REGULATING SYSTEM PROTECTED AGAINST WINDUP BY A CLAMP CIRCUIT

Robert S. Peterson, Williamsville, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 23, 1975, Ser. No. 580,381
Int. Cl.² H02P *7/30*
U.S. Cl. 318—271 **6 Claims**



1. In a motor control system having at least an inner and an outside control loop, wherein said inner loop includes limiter means for holding the output control signal of said control system for said motor within a predetermined control level, the combination of:

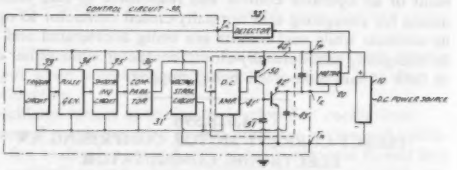
means responsive to limiting operation of said limiter means and operative with said outside loop for establishing an overriding error signal in relation to a control level existing in said outside loop upon initiation of said limiting operation; with said outside control loop including an input control signal representing a system variable and an integrator responsive to said input control signal for establishing a continuous integrated voltage characteristic of said control level for said system variable;

with said overriding error signal establishing means including means normally responsive to said integrated voltage for storage thereof as a stored voltage; said storage means becoming non-responsive to said integrated voltage when said limiter means is under limiting operation.

4,028,602
CONTROL CIRCUIT OF AN ELECTRIC MOTOR COMPRISING AN OUTPUT TRANSISTOR OF NPN TYPE

Kazuo Tokuda; Masanobu Tsugita, both of Tokyo, and Hiroshi Minakuchi, Kadoma, all of Japan, assignors to Nippon Electric Company, Ltd. and Matsushita Electric Industrial Co., Ltd., Japan

Filed July 9, 1975, Ser. No. 594,226
Claims priority, application Japan, July 11, 1974, 49-79951
Int. Cl.² H02P *5/12*
U.S. Cl. 318—345 B **9 Claims**



1. A circuit for controlling actual speed of an electric motor, the circuit being provided with first, second, third and fourth terminals, the first and second ones being respectively connected to positive and negative terminals of a d.c. power source, the first and third ones being coupled to the electric motor of which actual speed is supplied to the fourth one in the form of an electric frequency signal, wherein the improvement comprises:

first means connected between said first and second terminals for supplying a stabilized voltage which is stabilized in reference to a potential fed to the first terminal and which is arbitrarily varied relative to ground;

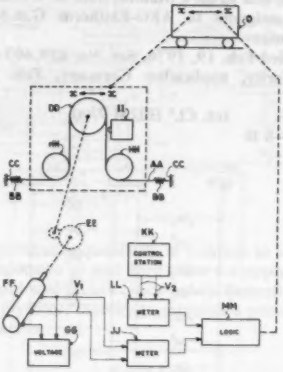
second means connected to the first means and responsive to said frequency signal representative of said actual speed of the electric motor for generating a difference signal for adjusting the actual speed of the motor to a desired value;

third means responsive to said difference signal for amplifying said difference signal and applying the amplified signal to said motor as a control signal, said third means comprising an output transistor of npn type provided with a base, an emitter and a collector and a level shift circuit coupled between said output transistor and said second means, said level shift circuit being resposive to said difference signal to provide a level shifted d.c. signal to the base of said npn transistor, said level shifted d.c. signal being independent of any variation of said power source, said emitter and collector of said output transistor being respectively connected to said second and third terminals.

4,028,603
DEVICE FOR DETECTING AND POSITIONING A MOBILE OBJECT CAPABLE OF MOVING IN AT LEAST ONE GIVEN PATH

Gabriel Selam, 161, Boulevard Edouard Vaillant, 93 Aubervilliers, France

Continuation-in-part of Ser. No. 381,070, July 20, 1973. This application June 24, 1975, Ser. No. 589,946
Claims priority, application France, July 31, 1972, 72.27550; Dec. 7, 1972, 72.43528
Int. Cl.² G05D 4/00
U.S. Cl. 318—587 30 Claims



1. Apparatus in combination with and for detecting the position of a heavy mobile object, such as a travelling crane, hoisting device or the like, capable of moving along at least one given pathway, said apparatus comprising:

an elongated information-bearing support with means for mounting it so as to extend in a direction parallel with and in the general vicinity of the pathway;

said information-bearing support having distance information data provided thereon;

a distance or position sensor with means for resiliently mounting it on said heavy mobile object so that said information data is capable of being correctly scanned by said sensor when the said object moves along said pathway and irrespective of any irregularities or deformations of pathway due in particular to movement of said heavy mobile object thereon;

means associated with said sensor for producing distance signals relating to the instantaneous position of said heavy object in response to detection of the information by said sensor;

said distance information data being recorded on said information-bearing support in at least two parallel bands having different distance scales, said parallel bands being capable of being scanned by said sensor, and

a control circuit operatively connected to said sensor and capable of using said distance signals to control operation of said heavy mobile object.

4,028,604
SERVO-MOTOR CONTROL SYSTEM

Masaaki Togo, Kawasaki; Masao Shima, Tokyo, and Kiyoshi Mochizuki, Kamakura, all of Japan, assignors to Yamatake-Honeywell Company Limited, Tokyo, Japan

Filed June 25, 1975, Ser. No. 590,209
Claims priority, application Japan, July 9, 1974, 49-75385
Int. Cl.² H02K 37/00; G05B 11/18
U.S. Cl. 318—596 6 Claims

1. A servo-motor control system for driving a servo-motor in an analog servo-system comprising in combination:

a comparator circuit having two input means and an output means;

means for generating a set point signal which periodically and continuously varies between predetermined limits;

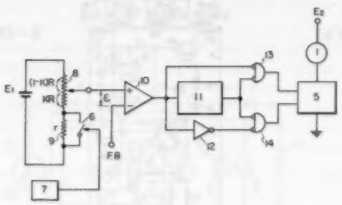
means for coupling said set point signal generator to one input means of said comparator;

means for coupling a feedback signal to the other input means of the comparator;

means for energizing said servo-motor;

means responsive to the output of said comparator for coupling said energizing means to said motor;

said responsive means coupling said energizing means to said motor for rotation in one direction when the difference between the feedback signal and the set point signal exceeds a predetermined percentage of the variation of the set point input to the comparator;



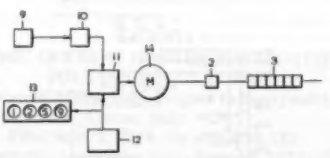
said responsive means coupling said energizing means to said motor for rotation in the opposite direction when the difference between the set point signal and the feedback signal is less than a negative quantity equal to a predetermined percentage of the variation of the set point signal; and

said responsive means disconnecting said energizing means from said motor when the difference between said set point signal and said feedback signal is less than a predetermined percentage of the variation in the set point signal.

4,028,605
SYSTEM FOR PASSING PRODUCTS TO BE TREATED THROUGH A MACHINE

Geurt J. Ruumpol, Wilp, Netherlands, assignor to Veco Beheer Electroforming/Photo Etching B.V., Eerbeek, Netherlands

Filed Jan. 29, 1975, Ser. No. 545,004
Claims priority, application Netherlands, Feb. 8, 1974, 7401788
Int. Cl.² H02K 37/00
U.S. Cl. 318—696 4 Claims

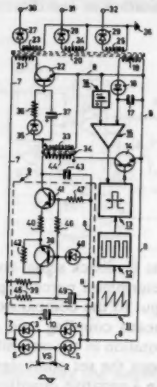


1. In a system for passing products to be treated through a machine, comprising a driving motor of the stepping type, a plurality of rollers driven by said motor, and a regulating circuit for controlling the driving motor, the improvement wherein the regulating circuit comprises a constant frequency oscillator, a fixed divider into which the output of said oscillator is fed, a variable frequency divider subject to the output of said fixed divider for providing a rectangular output for energizing the driving motor, and means for adjusting said variable frequency divider.

4,028,606
CONTROL CIRCUIT FOR A SWITCHED-MODE POWER SUPPLY, PARTICULARLY FOR A TELEVISION RECEIVER

Daniel Beuchée, Paris, and Alain Leclair, Poissy, both of France, assignors to U.S. Philips Corporation, Briarcliff Manor, N.Y.

Filed Dec. 10, 1975, Ser. No. 639,277
Claims priority, application France, Dec. 20, 1974, 74.42250
Int. Cl.² H02M *3/335*
U.S. Cl. 321—2 **8 Claims**

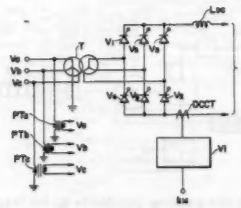


1. A control circuit for a switched-mode power supply, said power supply comprising a non-regulated rectified DC voltage source, a driver transistor, a first transformer having primary and secondary windings, an end of said primary being coupled to the collector-emitter path of said driver transistor, a switching transistor having a base coupled to said secondary, a second transformer having a primary winding coupled in series with said switching transistor, and a plurality of secondary windings, said control circuit comprising a first additional transistor having a collector coupled to the remaining end of the primary winding of the first transformer not connected to the driver-transistor and an emitter coupled to the non-regulated direct voltage source.

4,028,607
INVERTER CONTROL SYSTEM

Atsumi Watanabe, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

Filed Apr. 8, 1975, Ser. No. 566,091
Int. Cl.² H02M *7/00*
U.S. Cl. 321—5 **8 Claims**



1. In a control system for an inverter connected to an A.C. system through a transformer for the inverter, an improved inverter control system comprising:

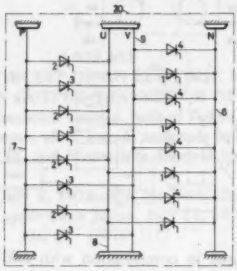
first means for receiving a control voltage and for generating, at an advanced control angle, phase-shifted gate pulses in synchronism with voltages in-phase with commutation voltages applied to said inverter during the normal condition of said A.C. system, and for applying said gate pulses to respective arms of said inverter at a fixed interval; and

second means, responsive to a change in at least one of the phase voltages and line voltages of said A. C. system, for correcting said control voltage in accordance with said change.

4,028,608
BRIDGE CIRCUIT ARRANGEMENT ON ELECTRICAL FREQUENCY CONVERTERS WHICH CAN BE FED WITH A D.C. CURRENT

Hans Matthes, and Erhard Mauler, both of Wermelskirchen, Germany, assignors to AEG-Elotherm G.m.b.H., Remscheid, Germany

Filed Feb. 19, 1976, Ser. No. 659,403
Claims priority, application Germany, Feb. 20, 1975, 2507316
Int. Cl.² H02M *7/00*
U.S. Cl. 321—8 R **3 Claims**



1. In a bridge circuit for an electric frequency converter that can be fed with direct current for converting direct current into alternating current comprising:

four contact rails,

means for mounting said rails substantially in parallel to one another and insulated electrically from one another to form a mechanical frame,

said rails forming four corner points of the bridge circuit, two of which as feed rails can be connected with a source of direct current and two of which as load rails can be connected with an output of the frequency converter,

four *n* controllable semiconductor switches *n* of which are always switched conductive in an arm of the bridge circuit in an electrical parallel circuit and are attached at a distance from one another to said contact rails so that between the rails in the plane of said rails, essentially parallel paths of the current flow via the semiconductor switches,

the improvement wherein said semiconductor switches are disposed in the frame of said four rails in such a way that locally adjacent and parallel running paths of the current flow always belong to different arms of the bridge and to arms of the bridge which are adjacent to the two feeder points of the bridge.

4,028,609
DIGITAL FIRING PULSE GENERATOR WITH PULSE SUPPRESSION

Richard L. Detering, Buffalo, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

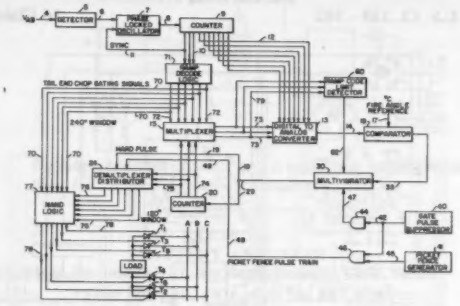
Filed Dec. 22, 1975, Ser. No. 642,809
Int. Cl.² H02M *7/00*
U.S. Cl. 321—5 **9 Claims**

1. Firing pulse generator for igniting sequentially a plurality of thyristors connected across a polyphase power supply, comprising:

timing means for establishing a firing angle by reference to a phase of said power supply;

first means responsive to said firing means for generating a hard pulse of minimum duration to set a selected one of said thyristors into conduction;

second means for freely generating a series of picket fence pulses of short duration relative to said hard pulse; and



means operative sequentially in relation to said thyristors and responsive to said hard pulse for applying said hard pulse and said picket fence pulses thereafter to said selected thyristor, thereby to establish a period of conduction therefor.

4,028,610

INVERTERS SUPPLYING A HIGH FREQUENCY ALTERNATING CURRENT

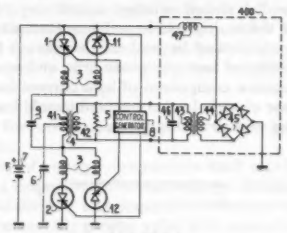
Edmond Cord'homme, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Aug. 18, 1975, Ser. No. 605,436

Claims priority, application France, Aug. 22, 1974, 74.28889

Int. Cl.² H02M *1/18*

U.S. Cl. 321—14 **4 Claims**



1. In a D.C. to A.C. power inverter having input terminals connectable to a source of direct current; output terminals connectable to an alternating current load; first circuit means for connecting the input and output terminals, the first circuit means including a first pair of controlled rectifiers connected through first and second inductors; and a capacitor coupled to the midpoint between the first and second inductors and to a ground or reference potential,

second circuit means for connecting the input and output terminals, the second circuit means including a second pair of controlled rectifiers, each controlled rectifier in the second pair of controlled rectifiers being connected across a respective controlled rectifier in the first pair of controlled rectifiers and poled in the opposite direction thereto;

a detector having its output connected to the input terminals; and

means tuned to the frequency of the alternating current and having a Q factor dependent upon the magnitude of the impedance of the alternating current load for coupling the input of the detector to the output terminals.

4,028,611

VOLTAGE STABILIZING DEVICE OF A MAGNETO ALTERNATING CURRENT GENERATOR

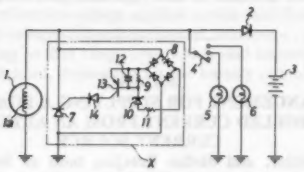
Minoru Tashiro, Yokohama; Shigeru Kimura, Tokyo, both of Japan, assignors to Stanley Electric Co., Ltd., Tokyo, Japan

Filed Aug. 14, 1974, Ser. No. 497,225

Claims priority, application Japan, Aug. 17, 1973, 48-6656[U]

Int. Cl.² G05F *1/44*

U.S. Cl. 323—8 **14 Claims**



1. A voltage stabilizing device for a magneto alternating current generator (1) which is connectable to an alternating current load (5, 6) and which is further connectable to a battery (3) through a rectifier (2), comprising:

a controlled rectifier means (7), having a control electrode, connected directly in parallel with said alternating current generator (1);

a full wave rectifier circuit means (8) connected in parallel with said alternating current generator (1) and in parallel with said controlled rectifier means (7); and

a gate control circuit means coupled to an output of said full wave rectifier circuit means (8) and to said control electrode of said controlled rectifier (7) for phase controlling said controlled rectifier, said gate control circuit means comprising:

means (10, 11) for comparing an output voltage of said full wave rectifier circuit means (8) with a reference voltage and for generating a control signal when said output voltage of said full wave rectifier circuit means exceeds a given voltage level; and

delay means (9, 12) coupled to said comparing means and responsive to said control signal for generating a trigger signal with a predetermined delay after generation of said control signal;

said trigger signal being coupled to said control electrode of said controlled rectifier means (7).

4,028,612

DYNAMIC CURRENT LIMITER FOR SWITCHING VOLTAGE REGULATORS

Luciano Orlando, Milan, Italy, assignor to Honeywell Information Systems Italia, Caluso, Italy

Filed Sept. 3, 1976, Ser. No. 720,151

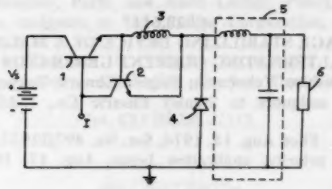
Claims priority, application Italy, Sept. 10, 1975, 27059/75

Int. Cl.² G05F *1/56*

U.S. Cl. 323—17 **2 Claims**

1. A dynamic current limiting circuit for a power supply, said power supply comprising a power switching transistor including a collector, a base and an emitter; a catch diode including an anode and a cathode; and an accumulator filter including capacitor and inductance means connected in parallel with said diode; said current limiting circuit comprising a feed-back transistor including collector, base and emitter elements; said collector element being connected to the base of said power switching transistor; said emitter element being

connected to the cathode of said diode; said base element being connected to the emitter of said power switching transistor; and a feed-back inductance connected between said base and emitter elements of said feed-back transistor.



4,028,613

ARRANGEMENT FOR SUPPLYING A LOAD WITH CONTROLLED CURRENT FROM AN ALTERNATING CURRENT SOURCE

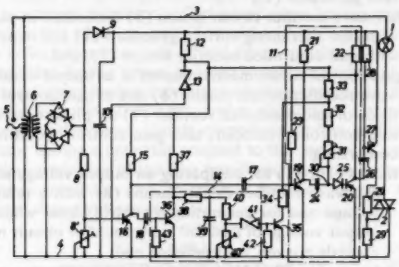
Armin Stiller, and Stefan Borejko, both of Braunschweig, Germany, assignors to Rollei-Werke Franke & Heidecke, Braunschweig, Germany

Continuation of Ser. No. 528,500, Nov. 29, 1974, abandoned. This application Mar. 26, 1976, Ser. No. 670,861

Claims priority, application Germany, Dec. 1, 1973, 2360048

Int. Cl.² G05F *5/00*

U.S. Cl. 323—19 **26 Claims**



1. In an arrangement for supplying a load with constant voltage from an AC source of variable voltage amplitude, said arrangement including bidirectional thyristor means in series with said load and said source, a monostable multivibrator arranged for controlling the conductive period of said thyristor means, and means for providing said monostable multivibrator with a rectified voltage proportional to said voltage amplitude of said source, said arrangement comprising:

a. threshold switch means arranged for changing state in response to each half wave of said rectified voltage crossing a predetermined threshold value;

b. said monstable multivibrator being arranged to change to its metastable state in response to said change of state of said threshold switch means;

c. said monostable multivibrator being arranged for supplying a gating pulse to said bidirectional thyristor means for making said bidirectional thyristor means conductive for a portion of each half wave of said AC source upon the return of said monostable multivibrator to its stable state;

d. R-C circuitry for establishing the reset time for said monostable multivibrator to return to its stable state; and

e. said R-C circuitry being connected to a constant DC voltage for varying said reset time as a function of said voltage amplitude of said source.

4,028,614

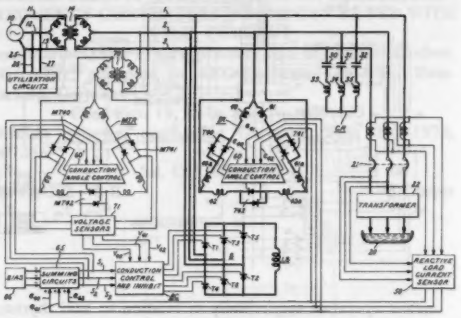
HIGH SPEED CONTROL OF REACTIVE POWER FOR VOLTAGE STABILIZATION IN ELECTRIC POWER SYSTEMS

Fred William Kelley, Jr., Media, Pa., assignor to General Electric Company, Philadelphia, Pa.

Filed May 3, 1976, Ser. No. 682,544

Int. Cl.² H02J *3/18*

U.S. Cl. 323—102 **16 Claims**



4. Reactive current compensating apparatus for a multiphase alternating current electric power circuit having load terminals and supply conductors subject to varying and unbalanced reactive current demand at said load terminals which comprises; balanced multiphase capacitive impedance means connected in said power circuit, balanced multiphase inductive impedance means connected in parallel circuit relation with said capacitive impedance means, said capacitive and inductive multiphase impedance means drawing from said power circuit a net amount of reactive compensating current, one said multiphase impedance means being controllable variably to counteract the other and having a predetermined maximum reactive current capability supplementary single phase reactive compensating impedance means, switching means for selectably connecting said single phase impedance means in parallel circuit relation across any one selected phase arm of the multiphase impedance means of like reactance thereby to extend beyond said maximum the reactive current capability of said one phase arm, and means responsive to the reactive component of load current in each phase of a multiphase electric load connected to said load terminals for controlling said switching means.

4,028,615

METHOD OF AND DEVICE FOR TESTING HERMETICALLY ENCLOSED REED CONTACTS

Friedrich Ludwig Jansen; Frederik Hendrik Gerritsen, and Johan Hendrik Adolph Glashorster, all of Hilversum, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 16, 1975, Ser. No. 622,997

Claims priority, application Netherlands, Sept. 1, 1975, 7510275

Int. Cl.² G01R *31/02*

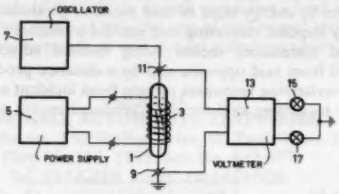
U.S. Cl. 324—28 RS **8 Claims**

1. A method of testing contact surfaces of reed switches having electrically conductive contact reeds comprising a magnetostrictive material and susceptible to torsional movement upon application of a magnetic field by a coil within which the switch is located, comprising

applying an excitation current which is a direct current to said coil so as to close contacts of said switch,

applying an alternating test current through said closed contacts, and

continuously varying the frequency of said test current between a minimum value less than a torsional resonant



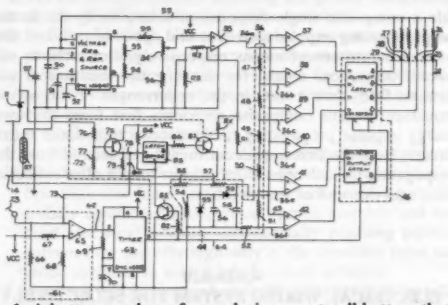
frequency of said contact and a maximum value greater than said torsional resonant frequency.

4,028,616

BATTERY ANALYZER

Carlile R. Stevens, 468 EL Rio Road, Danville, Calif. 94526

Filed Mar. 10, 1976, Ser. No. 665,519
Int. Cl.² G01N *27/42*
U.S. Cl. 324—29.5 **8 Claims**



1. A battery analyzer for analyzing a wet cell battery that is connected to a vehicle engine, including voltmeter means for measuring the voltage from said battery within a narrow range over which the unloaded battery output will vary as a function of specific gravity of the electrolyte of said battery, said voltmeter means comprising;

a resistor voltage divider;

a circuit for providing an input reference voltage across said divider;

a plurality of voltage comparators each receiving as a first input a respective reference voltage obtained from a tap on said divider, said respective reference voltages being of incrementally greater value with respect to each other;

input network means for applying to the other input of each voltage comparator a voltage derived from the output of the battery under test;

a like plurality of indicator lamps;

an output latch connected between the outputs of said comparators and said lamps, said latch, when enabled, causing certain of said lamps to light up to indicate those comparators at which the voltage derived from said battery exceeds the respective reference voltage, said lamps thereby indicating the unloaded battery voltage and hence the electrolyte specific of the battery under test;

said circuit for providing a reference voltage comprises;

an operational amplifier having a fixed reference voltage applied to the non-inverting input, the output of said amplifier being connected across said divider as said input reference voltage;

a feedback resistor connected between a tap of said divider and the inverting input of said operational amplifier to provide negative feedback that stabilizes the voltage at said tap;

a thermistor, mounted to sense the temperature of the electrolyte of said battery under test, and connected to the inverting input of said operational amplifier to correct said input reference voltage, and hence the voltage measurement, for changes in electrolyte temperature;

a range detect and latch circuit for changing the range of said voltmeter means when the battery voltage drops under load, said range detect and latch circuit comprising;

a flip-flop;

means for setting said flip-flop to a first state when the voltage of the unloaded battery is measured, and for setting said flip-flop to a second state in response to reduced voltage from said battery when under load; and

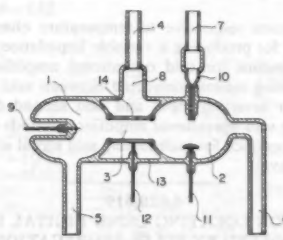
a range-change resistor and means for connecting said range-change resistor to the inverting input of said operational amplifier when said flip-flop is set to said second state, said range-change resistor thereby reducing the input reference voltage applied across said divider so that a lower voltage range is measured, said lower range corresponding to that range over which said battery will vary, when loaded, depending on the battery operational condition.

4,028,617

IONIZATION DETECTOR UTILIZING ELECTRIC DISCHARGE

Tomoichi Kamo, Hitachi, and Mikiya Yamane, Kunitachi, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 15, 1976, Ser. No. 649,356
Claims priority, application Japan, Jan. 16, 1975, 50-6356
Int. Cl.² G01N *27/00*; H01J *7/24*
U.S. Cl. 324—33 **17 Claims**



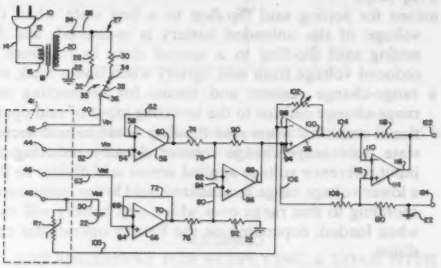
1. An ionization detector, comprising: a first chamber;a second chamber; means forming a communicating path between said first and second chambers to guide the light from said first chamber into said second chamber; means for producing an electric discharge as a light source in said first chamber, which means has a pointed discharge electrode directed toward said communicating path and a second electrode provided on at least one of said first chamber and said means forming a communicating path; inlet means for introducing a discharge gas between said first and second chambers; means for introducing a carrier gas containing a sample gas into said second chamber; outlet means for exhausting the discharge gas in said first chamber; outlet means for exhausting the carrier gas in said second chamber; and means, having a pair of collecting electrodes disposed in said second chamber, to detect the ionic current as caused by the ionization within said second chamber.

4,028,618

CIRCUIT FOR MONITORING THE CONDUCTIVITY OF A SOLUTION

Horace A. Teass, Jr., 36 Highland Terrace, Pleasantville, N.Y. 10570

Filed Jan. 9, 1976, Ser. No. 647,884
Int. Cl.² G01N 27/42
U.S. Cl. 324—30 R 3 Claims



1. A circuit for monitoring the conductivity of a solution comprising:

a conductivity cell having first and second drive probes and first and second receiving probes;

a constant current source connected to said first and second drive probes for supplying current thereto;

a first high impedance voltage follower amplifier connected at its input to said first receiving probe and having an output;

a second high impedance voltage follower amplifier connected at its input to said second receiving probe and having an output;

a differential amplifier having first and second inputs and an output for producing a signal proportional to the resistance and conductivity of said solution, said first input being connected to said first voltage follower output and said second input being connected to said second voltage follower output;

an operational amplifier having inverting and noninverting input being connected to said differential amplifier output;

sensing means responsive to temperature changes in said solution for producing a variable impedance; and,

feedback means for said operational amplifier including said sensing means connected between said operational amplifier inverting input and said second drive probe, whereby said operational amplifier responds to said variable impedance for maintaining said signal at a predetermined level.

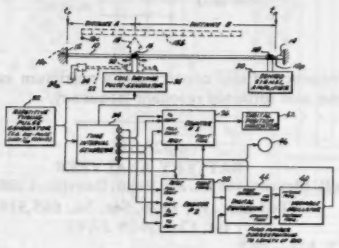
4,028,619

POSITION LOCATING USING DIGITAL LOGIC CONTROLLED BY PULSE PROPAGATION TIME INTERVALS

Gerald L. Edwards, Seattle, Wash., assignor to CX Corporation, Seattle, Wash.

Filed Sept. 22, 1975, Ser. No. 615,387
Int. Cl.² G01R 33/12
U.S. Cl. 324—34 PS 13 Claims

1. Apparatus for gauging location of a movable element in longitudinal relation to an elongated wave energy propagative member, comprising in combination a first transducer means positionally associated with said element and operable in energy transfer relationship with said member to induce a wave energy impulse locally in said member that propagates longitudinally therein bidirectionally from the first transducer means location, drive means operable to energize said first transducer means with an impulse having a duration a minor fraction of the time required for propagation of such wave energy impulse from end to end of the member, means terminating said member at one end thereof to reflect incident wave energy therein without phase reversal, the opposite end of said member being terminated to reflect incident wave energy therein with phase reversal, second transducer means in energy transfer relationship with said member responsive to changes in energy state of said member produced by a wave energy impulse traversing said second transducer means, said second transducer means being located adjacent to and spaced from said opposite end by a distance producing additive overlapping responses therein from incident and reflected waves traversing said second transducer means so as to provide a composite single response at substantially the instant the propagating impulse arrives at said opposite end, and time interval measurement means responsively connected to said second transducer means for deriving the location of said element from time events in the occurrences of the second transducer means composite responses first from the wave energy impulse propagating to the second transducer means directly from the first transducer means and second from that propagating to such second transducer means after reflection from said one end of the member.

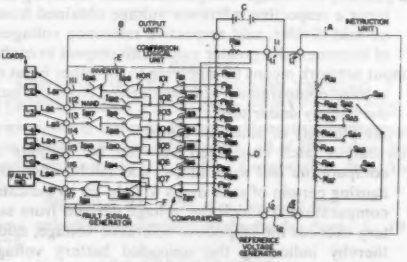


4,028,620

ELECTRICAL WIRING SYSTEM FOR SELECTIVELY ACTUATING ELECTRICAL LOADS

Junji Kitagawa, and Sigeyuki Akita, both of Okazaki, Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Oct. 9, 1975, Ser. No. 621,233
Claims priority, application Japan, Nov. 26, 1974, 49-136935
Int. Cl.² G01R 31/02; H02J 1/00; H04Q 1/08
U.S. Cl. 324—51 8 Claims



7. An electrical wiring system for selectively actuating a plurality of loads when connected to respective output terminals, comprising:

a plurality of said output terminals,

electrical power means,

output terminal selection means having a single signal output line and being connected across said power means for selectively applying to said signal line a voltage having an instant magnitude uniquely corresponding to the one of

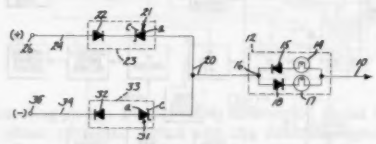
the said output terminals selected by said selection means, and

output means connected across said power means and to said signal line for generating on the basis of the instant magnitude of the voltage on said signal line a load actuating output signal at only the one of said output terminals which corresponds to said instant voltage magnitude.

4,028,621
PORTABLE AUTOMOTIVE TEST PROBE

James M. Bloxam, 133 Skyline Drive, St. Paul, Minn. 55110

Filed Dec. 18, 1975, Ser. No. 642,077
Int. Cl.² G01R *31/02, 19/14, 31/28*
U.S. Cl. 324—51 **12 Claims**



1. An automotive trouble-shooting test probe, comprising:

a. an electrically conductive probe member;

b. a first electrical terminal suitable for connection to a positive voltage output terminal of a storage battery;

c. a second electrical terminal suitable for connection to a negative or ground voltage output terminal of a storage battery;

d. a third electrical terminal;

e. a first circuit path electrically connecting said probe member with said third electrical terminal, comprising a first indicator lamp and a first current rectifying device serially connected between said probe member and said third electrical terminal for normally enabling positive current flow therethrough only in the direction from said probe member to said third electrical terminal;

f. a second circuit path electrically connected in parallel with said first circuit path between said probe member and said third electrical terminal, comprising a second indicator lamp and a second current rectifying device serially connected between said probe member and said third electrical terminal for normally enabling positive current flow therethrough only in the direction from said third electrical terminal to said probe member; and

g. a third circuit path, independent of said first and said second circuit paths, electrically connecting said first and said second terminals with said third terminal, comprising reference circuit means responsive to at least a predetermined threshold voltage level between said first or said second electrical terminals and said third electrical terminal, for establishing a fixed voltage reference level at said third electrical terminal, as measured with respect to the voltage levels present at said first and said second electrical terminals.

4,028,622
SELECTIVE INTERMODULATION DISTORTION MEASUREMENT

James Gifford Evans, and Gerald Demarest Haynie, both of Colts Neck, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 28, 1976, Ser. No. 700,537
Int. Cl.² G01R *27/00*
U.S. Cl. 324—57 N **12 Claims**

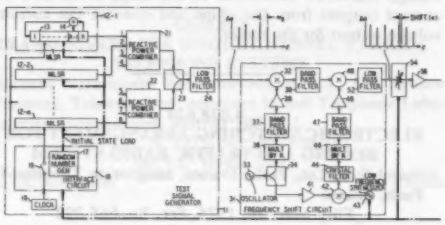
1. Apparatus for obtaining a measure of nonlinearity introduced by transmission apparatus comprising:

generating means for producing a wide bandwidth noise signal having a plurality of spectral components wherein the amplitude differences of the spectral components from the mean amplitude of all the spectral components substantially conform to a normal distribution over the frequency range of the wide bandwidth;

translating means for shifting the frequency of the noise signal by changing the frequency of each of the plurality of spectral components in the noise signal;

filtering means for substantially eliminating the spectral components in a frequency band to produce an output signal having a quiet band in the noise signal provided by said translating means;

means for applying the output of said filtering means to said transmission apparatus;



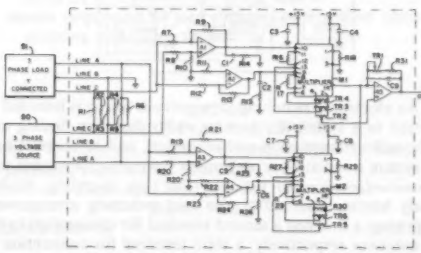
suppressing means connected to an output of said transmission apparatus for substantially reducing the faithfully delivered portion of the noise signal to reduce its strength relative to the intermodulation distortion products introduced by the nonlinearity of said transmission apparatus, and

selective detecting means for resolving and indicating the level of one order of the intermodulation distortion products.

4,028,623
THREE PHASE SPIN MOTOR POWER METER

James B. Dowdle, Jr., Orlando, Fla., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 6, 1976, Ser. No. 655,932
Int. Cl.² G01R *21/00*
U.S. Cl. 324—142 **1 Claim**



1. Meter for measuring the energy flows from a 3-phase quasi square excitation source to a 3-phase load with a Y connected floating neutral comprising a plurality of first amplifier means for sensing individual phase voltages; a plurality of second amplifier means for sensing individual phase currents; a plurality of multiplier means having first and second input terminals and an output terminal whereby inputs to the first and second terminals are multiplied by each other and the result fed to an output terminal; said plurality of first amplifier means having outputs connected individually to said first input terminals of the plurality of multiplier means; said plurality of second amplifier means having outputs connected individually to the second input terminal of said multiplier means; averaging means having a plurality of inputs and an output; said

outputs of said plurality of multiplier means being fed to the input terminals of said averaging so that the output of the averaging means will be an average of the outputs of the plurality of multiplier means; resistors connected between the 3-phase source and the 3-phase load; said load having one phase connected to ground; said second means being two differential amplifiers connected individually across different ones of said resistors so as to measure the current flow therein; said first means being two amplifiers connected individually between one side of different ones of said resistors and ground so as to sense two phases of the voltages; said multiplier means are electronic chips; and said averaging means is a current to voltage converter connected to the chips so as to average current outputs from the chips and convert the current to voltage output for the meter.

4,028,624
ELECTRONIC SWITCHING ARRANGEMENT FOR A HOMING AND TRAFFIC RADIO SYSTEM

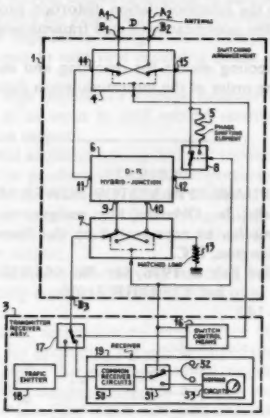
Armand Saint-Lot, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Mar. 10, 1976, Ser. No. 665,392

Claims priority, application France, Mar. 11, 1975, 75.07521

Int. Cl.² H04B *1/52*

U.S. Cl. 325—23 **8 Claims**



1. An electronic switching arrangement which is intented to be fitted to a system for homing radio direction-finding and traffic radio transmission and reception, and to connect in a said system a radiating arrangement having two antennas to a transmitter/receiver to produce the two operating modes, namely homing and traffic, the said switching arrangement comprising: a first and a second terminal for connection to the said antennas respectively; a third terminal for connection to the said transmitter/receiver; and switching and phase-shifting means which are connected to the two paths extending respectively from the said first and second terminals to the said third terminal, to make these paths of the same electrical length in the traffic mode and of different lengths in the homing mode by inserting a phase-shifting device in one path and, in this latter mode, to interchange the connections at the ends of the said paths to the said first and second terminals by means of a first double, two-channel switching device, the said phase-shifting device comprising a line element determined to introduce a phase-shift of $(2\pi D)/\lambda$, λ being the wavelength and D the distance between the said antennas predetermined at most equal to a quarter of the minimum wavelength of the operating band, and a coupling device of the $0 - \pi$ **hybrid junction type for coupling the said paths to the said third terminal while introducting a phase-shift of π in the said band in the homing mode and zero phase-shift in the traffic mode.**

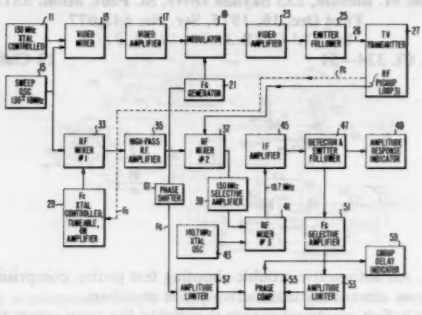
4,028,625
SIDEBAND ANALYZER FOR AM TRANSMITTERS

William Louis Behrend, Pittsburgh, Pa., assignor to RCA Corporation, New York, N.Y.

Filed May 5, 1975, Ser. No. 574,685

Int. Cl.² H04B *1/02*

U.S. Cl. 325—133 **8 Claims**



1. An anayzer for measuring the sideband response of an amplitude modulation transmitter under test over a predetermined band of frequencies comprising:

means for generating first and second frequency scan signals, the frequencies scanned over the same time period equalling said predetermined band of frequencies,

tone generator means for generating a tone,

first means responsive to said first frequency scan signal and said tone for amplitude modulating said first frequency scan signal with said tone,

coupling means for applying said first frequency scan signal amplitude modulated with said tone to said transmitter under test to produce transmitted sideband signals at sequentially changing sideband frequencies,

pick-up means to extract the modulated radio frequency signals from said transmitter,

second means including a mixer and frequency selector coupled to said pick-up means and additionally responsive to said second frequency scan signal for sequentially and individually providing at a fixed frequency said transmitted sideband signals as said second frequency scan signal scans said predetermined band of frequencies, and means including a tone detector coupled to said second means and responsive to the transmitted sideband signals at said fixed frequency for detecting the response of said tone amplitude modulated on the individual sidebands to thereby measure the individual sideband response of said transmitter under test.

4,028,626
DIGITAL DATA RECEIVER WITH AUTOMATIC TIMING RECOVERY AND CONTROL

David M. Motley, Santa Ana, and King Y. Cheng, Tustin, both of Calif., assignors to Hycom Incorporated, Irvine, Calif.

Continuation of Ser. No. 405,574, Oct. 11, 1973, abandoned, which is a continuation-in-part of Ser. No. 324,657, Jan. 18, 1973, abandoned. This application Mar. 24, 1975, Ser. No. 561,038

Int. Cl.² H04B *1/10*

U.S. Cl. 325—324 **23 Claims**

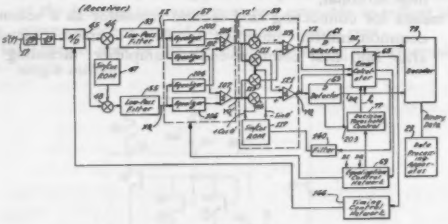
20. A receiver for receiving and detecting a modulated analog data signal comprising:

sampling means for providing a succession of digital samples from the analog signal;

noncoherent demodulated means for producing a demodu-

lated digital signal from the digital samples with the demodulated signal having components in first and second channels;

phase correction means for making corrections in the phase of the demodulated signal to provide a phase corrected signal having components in the first and second channels;



detecting means for providing a detected signal from the phase corrected signal with the detected signal having components in the first and second channels;

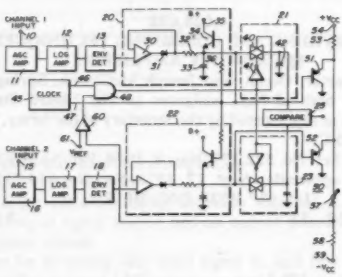
error calculator means responsive to at least one of the phase corrected signal and the detected signal for providing an error signal; and

said phase correction means including means responsive to the error signal to update said corrections so as to reduce the phase error in the phase corrected signal.

4,028,627
SAMPLE AND HOLD VALLEY DETECTOR

Susumu Cho, Elk Grove Village; Paul Milton Erickson, Oak Park, and Michael William Null, Schaumburg, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 29, 1975, Ser. No. 645,003
Int. Cl.² H04B *1/16*
U.S. Cl. 325—349 **8 Claims**



1. An audio signal quality detector comprising sample and hold valley detector means connected to receive an audio signal from the discriminator of a radio receiver, said sample and hold valley detector means comprising:

a. envelope detector means providing an output signal varying in accordance with peaks of the audio signal;

b. resettable valley detector means having an output, a signal input and a reset input for returning signals at the output to a predetermined level when a reset signal is applied to the reset input, said valley detector means including storage means for storing a signal indicative of the lowest valley applied to the signal input thereof subsequent to the last reset signal applied thereto, and the signal input of said valley detector means being coupled to receive the output signal from said envelope detector means;

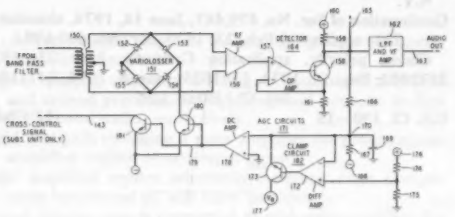
c. sample and hold gate means having a signal input, an output and a rigger input for operating said gate means to store a signal indicative of the amplitude of a signal present at the signal input when a trigger signal is applied to the trigger input, said signal input being coupled to the output of said valley detector means; and

d. clock means having a first output connected to the reset input of said valley detector means and having a second output connected to the sample and hold gate means trigger input, said clock means supplying first periodic pulses at the first output and second periodic pulses, delayed from the first periodic pulses, at the second output.

4,028,628
TRANSCEIVERS FOR SINGLE CHANNEL CARRIER TELEPHONE SYSTEMS

Tadikonda Narashimha Rao, Morristown, N.J., and Rouben Toumani, Teheran, Iran, assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 5, 1975, Ser. No. 638,152
Int. Cl.² H04B *1/16*
U.S. Cl. 325—400 **8 Claims**



1. A carrier receiving circuit including a variable attenuation circuit, a detector, and an automatic gain control circuit connecting the output of said detector to said attenuation circuit in order to maintain the average output of said detector at a preselected level, characterized by

a direct current clamp circuit connected to said automatic gain control circuit to clamp the output from said gain control circuit at a value close to the middle of the normal operation range of said automatic gain control circuit,

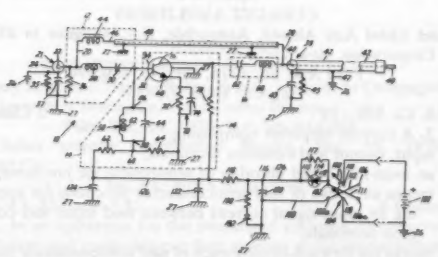
a differential amplifier for comparing the output of said detector to a preselected value, and

means responsive to said differential amplifier circuit for enabling said clamp circuit.

4,028,629
BAND PASS AMPLIFIER

Robert S. Ringland, Burlington, Iowa, assignor to Tandy Corporation, Fort Worth, Tex.

Filed Apr. 26, 1976, Ser. No. 679,882
Int. Cl.² H03F *3/04*
U.S. Cl. 330—2 **10 Claims**



1. Apparatus comprising:

first circuit means for passing a band of frequencies and attenuating all other freqencies;

amplifying means coupled to said first circuit means having an amplifying state for amplifying said band of frequencies and a non-amplifying state;

said first circuit means and said amplifying means having a first gain spread for the frequencies in said band of frequencies, when said amplifying means is in said amplifying state and a second gain spread for the frequencies in said band of frequencies when said amplifying means is in said non-amplifying state;

switch means coupled to said amplifying means for switching said amplifying means between said amplifying state and said non-amplifying state; and

second circuit means coupled to said switch means for making said first gain spread and said second gain spread substantially equal.

4,028,630

PUSH-PULL AMPLIFIER ARRANGEMENT

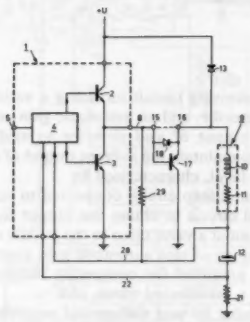
Wilhelm Graffenberger, and Gerd Onken, both of Hamburg, Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 479,467, June 14, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,699

Claims priority, application Germany, June 23, 1973, 2332092; Dec. 11, 1973, 2361525; Mar. 8, 1974, 2411108

Int. Cl.² H03F *3/26*

U.S. Cl. 330—15 **12 Claims**



1. An amplifier circuit arrangement comprising a first and a second push-pull controllable transistor both disposed in a monolithic semiconductor body, a connection terminal point coupled to said transistors to which a load can be connected, means for applying an input signal to said transistors, and a push-pull output amplifier comprising the first transistor and a third transistor disposed outside of said body, the second transistor supplying only the base current for the third transistor.

4,028,631

CURRENT AMPLIFIERS

Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 26, 1976, Ser. No. 680,074

Int. Cl.² H03F *3/343*

U.S. Cl. 330—19 **5 Claims**

3. A current amplifier comprising:

input, output and common terminals;

an even-numbered plurality of semiconductor junctions;

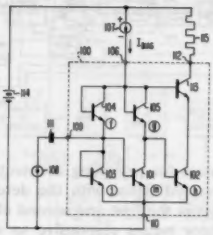
means exclusive of said semiconductor junctions for applying an input signal current between said input and common terminals;

means for forward-biasing each of said semiconductor junctions;

first and second junction transistors of the same conductivity type, each having base and emitter and collector electrodes and being operated at substantially the same temperature;

means for connecting said first transistor as a first common-emitter amplifier, including a connection without intervening elements of its base electrode to said input terminal and a connection of its emitter electrode to said common terminal;

means for connecting said second transistor as a second common-emitter amplifier in direct-coupled cascade after said first common-emitter amplifier, including a



connection of its base electrode to the collector electrode of said first transistor, a connection of its emitter electrode to said common terminal and a connection of its collector to said output terminal; and

a direct coupled current feedback connection of the collector electrode of said first transistor to its base electrode through a series connection of said plurality of semiconductor junctions poled in a first direction within said series connection and the remaining half of said plurality of semiconductor junctions poled in a second direction opposite to said first direction within said series connection.

4,028,632

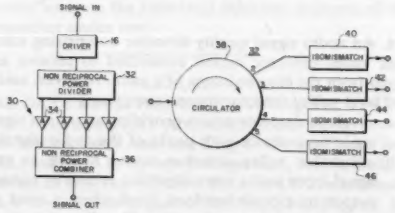
POWER DIVIDING AND COMBINING TECHNIQUES FOR MICROWAVE AMPLIFIERS

John L. Carter, Ocean, and Joseph McGowan, Spring Lake Heights, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 522,177, Nov. 8, 1974, Pat. No. 3,928,806. This application Sept. 17, 1975, Ser. No. 614,711

Int. Cl.² H03F *3/60;* **H01P** *1/36*

U.S. Cl. 330—53 **3 Claims**



1. A power amplifier comprising:

nonreciprocal means for subdividing the power of an input microwave signal into N fractions and for isolating the N fractions from one another,

N substantially identical solid-state power amplifier units for amplifying the N fractions respectively, and

nonreciprocal means for combining the amplified fractions and emitting them as a single output,

said nonreciprocal combining means including a circulator having a plurality of input ports and one output port and a plurality of isoreflectors each having an input port and an output port,

each of said isoreflectors output ports being connected to corresponding ones of said circulator input ports,

each isoreflector being operable to transmit power received from the corresponding power amplifier unit and incident at the isoreflector input port and operable to reflect all power incident at said isoreflector output port,

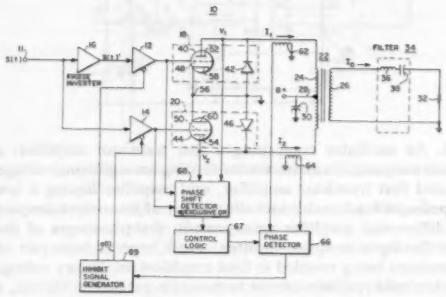
said output port of the circulator providing the aforesaid single output.

4,028,633

DRIVE CONTROL TO PREVENT SIMULTANEOUS CONDUCTION IN PUSH-PULL SWITCHING AMPLIFIER

Jimmy Dale Rogers, Dallas, and Michael Earl Creecy, Richardson, both of Tex., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 19, 1976, Ser. No. 706,410
Int. Cl.² H03F *3/28*
U.S. Cl. 330—118 **14 Claims**



1. A push-pull amplifier comprising:

an input signal source;

first and second switching amplifier elements coupled to said input signal source and an output providing output current signals;

means for inverting said input signal to said first switching amplfier element 180° relative to said input signal applied to said second switching amplifier element;

first drive means coupling the inverted input signal to said first switching amplifier element, and second drive means coupling said input signal to said second switching amplifier element, said first switching amplifier element conducting said inverted input signal only when said first drive means is enabled, and said second switching amplifier element conducting said input signal only when said second drive means is enabled;

phase detection means to detect the phase of said output current signals; and

control means coupled to said phase detection means to provide control signals to enable one of said first and second drive means to conduct while inhibiting the other of said first and second drive means;

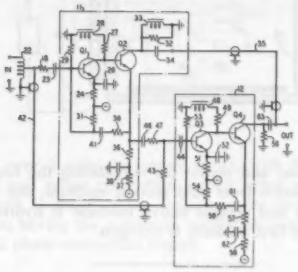
whereby said first and second switching amplifier elements will be prevented from simultaneous conduction and will conduct said input signal alternately at approximately 180° intervals.

4,028,634

FEED-FORWARD AMPLIFIER WITH SIMPLE RESISTIVE COUPLING

Kenneth Donald Tentarelli, Atkinson, N.H., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 11, 1976, Ser. No. 657,087
Int. Cl.² H03F *1/00*
U.S. Cl. 330—151 **7 Claims**



1. A feed-forward amplifier for amplifying electromagnetic wave signals comprising:

signal splitting means for dividing an input signal into first and second portions and applying said portions to first and second paths, respectively,

said first path including a main amplifier for producing an amplified replica of said input signal,

said amplified replica inherently including error components introduced by said main amplifier,

signal tapping means connected to said main amplifier for tapping off a portion of said amplified replica and applying it to a third path,

first signal combining means connected to said second and third paths for effecting subtraction of said second input signal portion from said amplified replica portion to produce an error signal substantially proportional to said error components, and for preventing feedback from said third path to said second path,

error amplifying means connected to said first signal combining means for amplifying said error signal, and

second signal combining means connected to said first path and said error amplifying means for effecting subtraction of said error components from said amplified replica to produce a substantially distortion-free output signal,

CHARACTERIZED IN THAT

said main amplifier has an output port with substantially zero output impedance,

said signal tapping means comprises a resistive splitting junction formed at said output port,

said error amplifying means has an input port with substantially zero input impedance, and

said first signal combining means comprises a resistive summing junction formed at said input port,

said third path introducing substantially zero phase shift between said output and input ports.

4,028,635

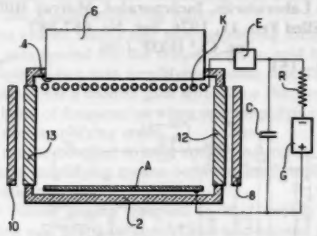
VIBRATION ENERGY TRANSFER LASER

Henry Brunet, L'Hay les Roses, France, assignor to Compagnie Generale d'Electricite, Paris Cedex, France

Filed Dec. 24, 1975, Ser. No. 644,008
Claims priority, application France, Jan. 15, 1975, 75.01176
Int. Cl.² H01S *3/22, 3/097*
U.S. Cl. 331—94.5 G **4 Claims**

1. In an apparatus for the stimulated emission of coherent radiation and comprising: a first gaseous molecular medium; means for exciting said first medium by supplying vibrational energy to its molecules; a second active gaseous molecular

medium; means for mixing said first and second mediums whereby vibrational energy is transferred from said first to said second medium to create a population inversion in said



second medium; and means for stimulating the emission of coherent radiation from said second medium; the improvement wherein said second active medium is hydrogen bromide, and said first medium is nitrogen.

4,028,636

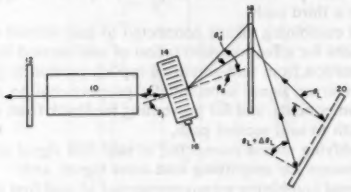
ACOUSTO-OPTICAL DEFLECTOR TUNED ORGANIC DYE LASER

Richard Swart Hughes, China Lake, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation of Ser. No. 374,746, June 28, 1973, abandoned. This application Mar. 8, 1976, Ser. No. 664,784

Int. Cl.² H01S *3/10*

U.S. Cl. 331—94.5 C **6 Claims**



1. A laser tuning system comprising:

a laser cavity having two ends and including a laser cell emitting a band of laser light frequencies;

a laser output mirror bounding one end of said cavity;

an acousto-optic diffraction cell positioned in said laser cavity to diffract said laser light at an angle of diffraction;

means connected to said acousto-optic diffraction cell for controlling the angle of diffraction of the laser light; and

means at the other end of said laser cavity for retroreflecting, in response to said angle of diffraction, only one frequency of said band of laser light frequencies.

4,028,637

PARAMETRICALLY-STABLE NEGATIVE RESISTANCE DIODE CIRCUIT

James Walter Gewartowski, Allentown, and William Edward Schroeder, Coopersburg, both of Pa., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 14, 1976, Ser. No. 695,584

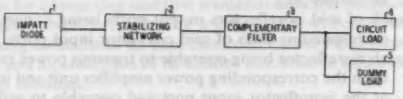
Int. Cl.² H03F *3/10*; **H03B** *5/12*

U.S. Cl. 331—107 R **10 Claims**

1. A parametrically-stable microwave circuit comprising:

a negative resistance diode for generating microwave signals;

a stabilizing network coupled to said diode for presenting to said diode a predetermined impedance over a broad range of frequencies including a low frequency and an operating frequency, thereby suppressing spurious oscillations in the circuit; and



means coupled to said network for selectively coupling said signals to a dummy load or a circuit load and presenting to said network a substantially constant impedance from said low frequency to the operating frequency.

4,028,638

STABILIZED CRYSTAL CONTROLLED OSCILLATOR

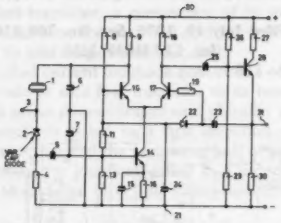
Allistair Towle, Willowdale, Canada, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 15, 1976, Ser. No. 666,603

Claims priority, application Canada, Mar. 20, 1975, 222663

Int. Cl.² H03B *3/02, 5/36*

U.S. Cl. 331—109 **6 Claims**



1. An oscillator comprising a first transistor amplifier, a tuned resonant circuit means for feeding an oscillatory voltage to said first transistor amplifier, said amplifier having a low impedance load circuit including a pair of transistors coupled in differential amplifier arrangement, the transistors of the pair having a common emitter circuit, one of said pair of transistors being coupled to feed amplified oscillatory voltage back to said resonant circuit to maintain oscillation therein, a rectifier system, the other of said pair of transistors being coupled for feeding amplified oscillatory voltage to said rectifier system to produce a pair of opposed direct current control voltages, and means to supply said direct current control voltages to the control electrodes of the pair of transistors with such polarity as to reduce the conductivity of said one transistor of the pair and increase the conductivity of the other transistor of said pair.

4,028,639

OSCILLATOR USING MAGNETOSTATIC SURFACE WAVE DELAY LINE

Peter J. Hagon, Corona del Mar, and John Haworth, Placentia, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 3, 1975, Ser. No. 619,268

Int. Cl.² H03B *5/32*

U.S. Cl. 331—107 A **2 Claims**

1. A tunable variable frequency oscillator comprising:

amplifier means having an input port and an output port for an electrical signal; and

magnetostatic surface wave delay line means for controlling the frequency of said electrical signal interconnected in a feedback path coupled around said amplifier means from the output port thereof to the input port thereof, said magnetostatic surface wave delay line means comprising:

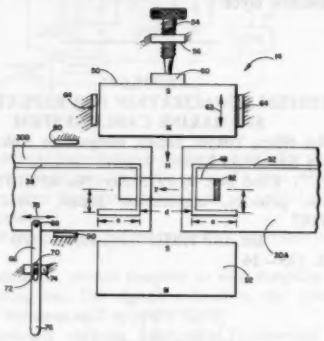
a magnetostatic surface wave propagating medium having a substantially planar propagation surface,

magnetic means for establishing a bias magnetic field having a magnetic field intensity substantially parallel to said propagation surface;

input microstrip coupling means adjacent said propagation surface for receiving said electrical signal from the output port of said amplifier means and for causing a magnetostatic disturbance on said propagation surface in response to said electrical signal;

said input microstrip coupling means having an orientation with respect to said propagation surface and said magnetic field intensity which causes said magnetostatic disturbance to propagate along said propagation surface in a direction perpendicular to said magnetic field intensity; and

output microstrip coupling means adjacent said propagation surface and displaced from said input coupling means for sensing said magnetostatic disturbance propagated thereto from said input coupling means whereby said electrical signal is re-established in said output



coupling means for connection to the input port of said amplifier means;

said microstrip coupling means each comprising:

a ground plane of conductive material;

a substrate of dielectric material positioned adjacent said ground plane; and

a narrow strip of conductive material deposited on said substrate wherein said substrate is interposed between said strip of conductive material and said ground plane;

means for moving said magnet means relative to said magnetostatic surface wave propagating medium to vary the intensity of the magnetic field at said magnetostatic surface wave propagating medium to vary the frequency of oscillation of said oscillator;

means for moving at least one of said microstrip couplers with respect to the other of one of said microstrip couplers and said magnetostatic surface wave propagating medium to vary the displacement of said microstrip couplers from each other to vary the frequency of oscillation of said oscillator.

4,028,640
PIEZO-ELECTRIC TUNING FORK OSCILLATION CIRCUIT

Takeshi Nakamura, Hakui, Japan, assignor to Murata Manufacturing Co., Ltd., Kyoto, Japan

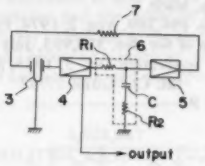
Filed Mar. 12, 1976, Ser. No. 666,268

Claims priority, application Japan, Mar. 13, 1975, 50-30756

Int. Cl.² H03B *5/36*

U.S. Cl. 331—116 R **5 Claims**

1. A piezo-electric tuning fork oscillation circuit which comprises a piezo-electric tuning fork and an external circuit coupled to said piezo-electric tuning fork, said external circuit being provided with a phase correction-circuit including resistor and capacitor elements, with said phase correction circuit having phase characteristics wherein the oscillation frequency coincides with the center frequency of the piezo-electric tuning fork over a wide frequency range, with the phase shift angle of said phase correction circuit being adapted to increase with increase of the frequency for producing stable oscillation having the maximum oscillation output obtainable from said phase correction circuit.



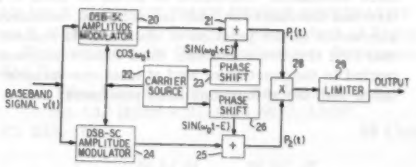
4,028,641
LINEAR PHASE MODULATOR INCLUDING A PAIR OF ARMSTRONG MODULATORS

William Fred Bodtmann, Middletown, and Clyde Leslie Ruthroff, Holmdel, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 11, 1976, Ser. No. 685,407

Int. Cl.² H03C *3/40*

U.S. Cl. 332—18 **6 Claims**



1. A method of generating a phase modulated signal having essentially no even-order and third-order nonlinearities, comprising the steps of:

a. concurrently modulating an input signal with a first carrier signal in a first and a second suppressed-carrier modulator arranged in separate parallel paths for generating first and second output signals, respectively;

b. adding to each of said first and second output signals a second and a third carrier signal, respectively, for generating respective third and fourth output signals, said second and third carrier signals comprising the same frequency as said first carrier signal while differing in phase from quadrature by preselected equal and opposite amounts; and

c. combining said third and fourth output signals in a multiplier circuit for generating the phase modulated signal having essentially no even-order and third-order nonlinearities.

4,028,642

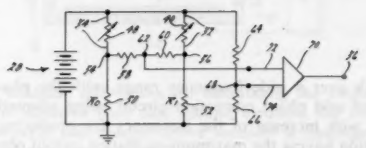
CIRCUIT FOR CONVERTING A TEMPERATURE DEPENDENT INPUT SIGNAL TO A TEMPERATURE INDEPENDENT OUTPUT SIGNAL

Toshimoto Kushida, Dearborn, and Eleftherios M. Logothetis, Birmingham, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 494,269, Aug. 2, 1974, Pat. No. 3,915,135, which is a division of Ser. No. 375,993, July 2, 1973, Pat. No. 3,868,846. This application Oct. 3, 1975, Ser. No. 619,344

Int. Cl.[2] G01R *17/02*

U.S. Cl. 323—75 B **5 Claims**



1. A bridge circuit, for use in conjunction with a variable resistor whose resistance varies predictably in response to a sensed parameter and which varies by a factor of K_1 in response to a parasitic parameter, to generate an output signal which is independent of the parasitic parameter comprising:

a voltage source connected to the variable resistor;

a first resistance connected in series relationship with the variable resistor and said source operative to provide a first electrical circuit;

a first voltage divider connected to said source in parallel with said first circuit, said first voltage divider having at least one fixed resistance connected in series with at least one variable resistance;

said at least one variable resistance selected to be variable only in response to the parasitic parameters and arranged to provide a voltage at the junction of the at least one fixed resistance and the at least one variable resistance which varies by a factor of K_2 in response to the parasitic parameter, K_2 being inversely related to the voltage variation demonstrated at the junction of the variable resistor and said first resistance in the presence of the parasitic parameter; and

second voltage divider means comprising second and third fixed resistances connected in series to form a signal terminal therebetween, said second fixed resistance also connected to the junction of the variable resistor with said first resistance and said third fixed resistance connected to the junction of said at least one variable resistance with the at least one fixed resistance.

4,028,643

WAVEGUIDE HAVING STRIP DIELECTRIC STRUCTURE

Tatsuo Itoh, Menlo Park, Calif., assignor to University of Illinois Foundation, Urbana, Ill.

Filed May 12, 1976, Ser. No. 685,627

Int. Cl.[2] H01P *3/16, 3/20, 5/18, 7/00*

U.S. Cl. 333—6 **25 Claims**

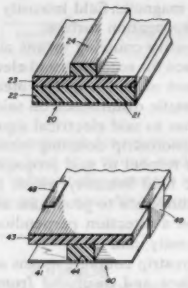
1. A microwave waveguide, comprising:

a conductive ground plane;

a first dielectric layer disposed on a surface of said ground plane;

a second dielectric layer overlaying said first dielectric layer, said second dielectric layer having a higher dielectric constant than said first dielectric layer; and

an elongated dielectric strip formed on said second dielectric layer, said strip having a width which is substantially less than that of said second dielectric layer said strip being formed of material having a dielectric constant



which is less than the dielectric constant of said second dielectric layer.

4,028,644

SYSTEM EQUALIZATION FOR REPEATERED SUBMARINE CABLE SYSTEM

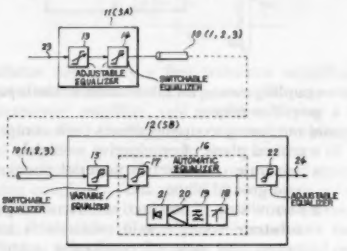
Yasuhiko Niiro, Tokyo, Japan, assignor to Kokusai Denshin Denwa Kabushiki Kaisha, Japan

Filed Dec. 9, 1975, Ser. No. 639,107

Claims priority, application Japan, Dec. 16, 1974, 49-144287

Int. Cl.[2] H03H *7/16;* **H04B** *3/10*

U.S. Cl. 333—16 **6 Claims**



1. A system equalizer, for use in a repeatered submarine cable system including automatic gain controlled submerged of a temperature following type, comprising:

a switchable equalizer connected to a repeatered submarine cable system including automatic gain controlled submerged repeaters of a temperature following type and switchable to select an optimum one of a plurality of loss-frequency characteristics corresponding to the total of compensation errors in said automatic gain controlled submerged repeaters to compensate for a seasonal misalignment of the repeatered cable system;

an automatic equalizer, including pilot signal detecting means for detecting a pilot signal transmitted through the repeatered cable system and for developing a control signal representative of the detected pilot signal, and connected to said switchable equalizer and having a loss-frequency characteristic proportional to the square root of frequency to compensate for short-term level fluctuations of the repeatered cable system under control of the control signal developed by said pilot signal detecting means; and

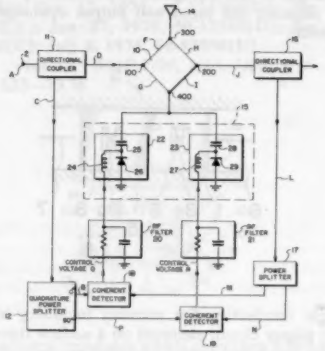
an adjustable equalizer connected to said automatic equalizer to compensate for an unknown fixed deviation developed at an output of said automatic equalizer.

4,028,645

AUTOMATIC IMPEDANCE MATCHING USING RESISTIVE AND REACTIVE DIODES

Frank J. Tressa, Deer Park, N.Y., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 21, 1976, Ser. No. 698,447
Int. Cl.² H03H *7/40*
U.S. Cl. 333—17 M **7 Claims**



7. An automatic impedance matching circuit for maintaining isolation between two opposite ports of a four port hybrid in spite of random impedance variations at a third port said hybrid comprising:

means to sample the signals at both of the two said opposite ports;

coherent detector means coupled to said sampling means for deriving two DC signals related to the amount of leakage between said opposite ports;

an electronically variable impedance, connected to the fourth port of said hybrid; and

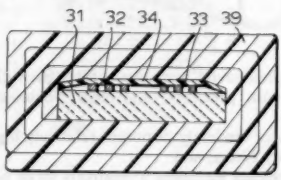
means to electronically vary said variable impedance in response to said DC signals in such a manner as to minimize the coupling between said opposite ports.

4,028,646

ELASTIC SURFACE WAVE DEVICES AND METHOD FOR MAKING THE SAME

Hiroshi Ikushima, Katano; Yasuo Nakajima, Osaka; Kitokazu Hagiwara, Hirakata, and Takashi Nagata, Ikeda, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Dec. 29, 1975, Ser. No. 645,288
Claims priority, application Japan, Dec. 30, 1974, 50-1021; Mar. 20, 1975, 50-34106
Int. Cl.² H03H *9/26, 9/30, 9/10;* **H01L** *41/22*
U.S. Cl. 333—72 **24 Claims**



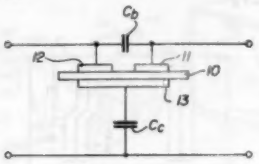
1. A surface elastic wave device comprising a resin casing having embedded therein a unitary body comprising: a piezoelectric plate; a transmitting interdigital transducer and a receiving interdigital transducer attached on one major surface of said piezoelectric plate, each transducer comprising a pair of electrodes facing each other, a wave propagation surface for a surface elastic wave being thereby defined on said major surface of said piezoelectric plate between said transducers; a thin film coextensive with said propagation surface and in contact with both of said transducers for preventing said surface elastic wave from being transferred from said wave propagation surface to said resin casing; and two pairs of electrical leads, the leads of one pair of which are respectively connected to the electrodes of said pair of electrodes of said transmitting transducer and the leads of the other pair of which are respectively connected to the electrodes of said pair of electrodes of said receiving transducer, all of said electrical leads being out of contact with said wave propagation surface.

4,028,647

MONOLITHIC CRYSTAL FILTERS

Henry Kai-Hen Yee, Montreal, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Apr. 29, 1976, Ser. No. 681,438
Int. Cl.² H03H *9/26, 13/00, 7/08*
U.S. Cl. 333—72 **9 Claims**



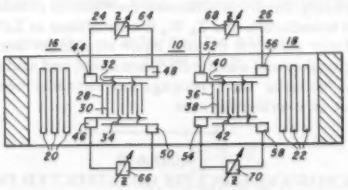
1. A monolithic bandpass filter unit having an upper and a lower stopband comprising a monolithio piezoelectric substrate substrate having two adjacent electrodes on one surface thereof constituting two bilateral terminals of said filter unit, and a common electrode on the other surface opposite said two electrodes, whereby the resulting structure acts as a pair of coupled resonators; predetermined coupling capacitance between said two adjacent electrodes; and a capacitor interconnecting said common electrode and a common terminal of said filter unit and adapted, in cooperation with said coupling capacitance, to introduce a pair of finite poles one in each of the stopbands of said filter unit.

4,028,648

TUNABLE SURFACE WAVE DEVICE RESONATOR

Clinton S. Hartmann, and Robert E. Stigall, both of Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 8, 1976, Ser. No. 665,015
Int. Cl.² H03H *9/02, 9/26, 9/32, 13/00*
U.S. Cl. 333—72 **18 Claims**



1. A tunable surface wave resonator comprising:

a piezoelectric substrate;

a pair of reflector arrays on said substrate, said reflector arrays being aligned in spaced parellel relation to each other and respectively disposed at the opposite outer extremities of said substrate so as to provide a multiresonant cavity therebetween;

each of said reflector arrays comprising a plurality of spaced parallel discontinuities formed on said substrate,

tuning means formed on the substrate in the miltiresonant cavity, said tuning means being independent of said reflector arrays and selectively positioned as to the reflector arrays to provide selective uniform tuning for all modes of the multiresonant cavity; and

surface acoustic wave transducer means formed on said substrate and disposed between said tuning means and operably associated therewith to generate standing waves at a desired resonant frequency.

4,028,649

SURFACE ACOUSTIC WAVE FILTER

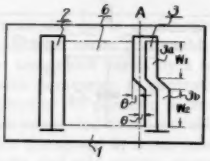
Yasutoshi Komatsu, Ayasemachi, and Yuzuru Yanagisawa, Fujisawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 19, 1975, Ser. No. 642,345

Claims priority, application Japan, Dec. 25, 1974, 50-3867; July 24, 1975, 50-90641

Int. Cl.² H03H 9/04, 9/26, 9/32; H01L 41/10

U.S. Cl. 333—72 **6 Claims**



1. A surface acoustic wave filter comprising:

a. a piezo-electric substrate having a major surface;

b. input and output transducers formed on the major surface of said substrate, each of said transducer consisting of a plurality of transducer elements; and

c. a plurality of surface acoustic wave propagation channels formed on said substrate between said input and output transducer; in which, when the width of a channel k is taken as W_k, and the phase difference between the length of the channel k and n times the wave length at the center frequency is taken as θ_k(n being a positive integer), the values of θ_k and W_k are selected to satisfy the following condition:

$$\frac{\left|RR'\left(\Sigma_k W_k e^{in\theta_k}\right) + (RQ' + R'Q)\left(\Sigma_k W_k e^{in\theta_k}\right)\left(\Sigma_k W_k e^{in\theta_k}\right) + QQ'\left(\Sigma_k e^{in\theta_k}\right)^2\right|}{\left|\Sigma_k W_k e^{in\theta_k}\right|} < 10^{-2}$$

where R and R′ are, respectively, mechanical reflection coefficients of said input and output transducers, Q and Q′ are, respectively, electrical reflection coefficients of said input and output transducers, and $\Sigma_k W_k$ is normallized as $\Sigma_k W_k = 1$, the transducer elements of said input transducer being located close together and electrically connected, and said plurality of surface acoustic wave propagation channels being formed without an overlapping area.

4,028,650

MICROWAVE CIRCUITS CONSTRUCTED INSIDE A WAVEGUIDE

Yoshihiro Konishi, Sagamihara; Kenichi Konno, Tokyo; Norihiko Yazawa, Kawasaki, and Norio Hoshino, Tokyo, all of Japan, assignors to Nippon Hoso Kyokai, Tokyo, Japan

Continuation of Ser. No. 361,817, May 18, 1973, Pat. No. 3,914,713. This application May 8, 1975, Ser. No. 575,512

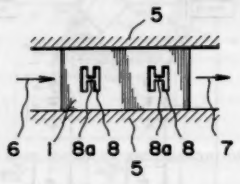
Claims priority, application Japan, May 23, 1972, 47-50993

Int. Cl.² H01P 1/20

U.S. Cl. 333—73 W **5 Claims**

1. In combination with a waveguide having input and output openings and capable of sustaining an electric field along an E-plane parallel to the longitudinal axis of said waveguide, said waveguide having a predetermined first cut-off frequency,

a single conductive flat member mounted within said waveguide in parallel with said E-plane so as to form a cut-off region having a second cut-off frequency at a position where said single conductive flat member is inserted, said single conductive flat member having substantially the same height along the length of the member as the full inner height of said waveguide and uninterrupted straight edges adjacent the input and output openings of said waveguide,



said single conductive flat member including input and output planar circuit elements on a surface thereof adjacent the input and output openings respectively of said waveguide for coupling electromagnetic energy between said input and output openings at the second cut-off frequency, said second cut-off frequency being approximately double said first cut-off frequency when said conductive flat member is positioned substantially along the longitudinal axis of said waveguide, the input electromagnetic field being attenuated sufficiently at said second cut-off frequency to prevent coupling of electromagnetic energy directly between the input and output openings of said waveguide.

4,028,651

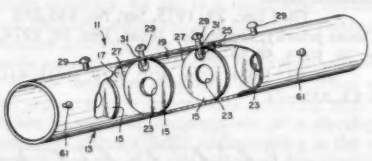
COUPLED-CAVITY MICROWAVE FILTER

Juri G. Leetmaa, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed May 6, 1976, Ser. No. 683,979

Int. Cl.² H01P 1/20, 5/04, 7/06, 1/16

U.S. Cl. 333—73 W **6 Claims**



1. A coupled-cavity microwave filter providing a narrow bandwidth with precisely controlled frequency responses, comprising:

a plurality of tandemly disposed, relatively high Q cylindrical cavity filters; and

coupling means including a relatively large non-adjustable primary iris aperture for coupling adjacent ones of said cavities, said coupling means also including a relatively smaller secondary tuning aperture disposed adjacent the outer edge of said irises, each of said secondary tuning apertures containing a tuning screw extending through a wall of an associated one of said cylinders for precisely adjusting the coupling between such adjacent cavities without degrading the cavity Q's thereof.

4,028,652
DIELECTRIC RESONATOR AND MICROWAVE FILTER USING THE SAME

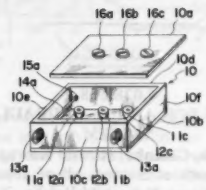
Kikuo Wakino, Muko; Toshio Nishikawa, Nagaokakyo; Sadahiro Tamura, and Youhei Ishikawa, both of Kyoto, all of Japan, assignors to Murata Manufacturing Co., Ltd., Kyoto, Japan

Filed Sept. 5, 1975, Ser. No. 610,780

Claims priority, application Japan, Sept. 6, 1974, 49-107909[U]; Oct. 12, 1974, 49-123304[U]; Jan. 22, 1975, 50-10752[U]; Jan. 27, 1975, 50-12555[U]; Jan. 27, 1975, 50-12556[U]; July 4, 1975, 50-93990[U]

Int. Cl.² H01P *7/06, 1/16, 1/20, 3/16*

U.S. Cl. 333—73 W **9 Claims**



1. A dielectric resonator which comprises a block of dielectric material and at least one aperture formed in said block, said aperture having a diameter selected to be within such a range that a substantial increase in frequency at a spurious mode having a spurious frequency adjacent a frequency at the dominant mode takes place relative to that attained by said dielectric block without said aperture, said diameter range also being such that an increase in frequency at the dominant mode relative to that attained by said dielectric block without said aperture takes place to a negligible extent, the ratio of the spurious frequency attained in the apertured dielectric resonator to that attained by the frequency at the dominant mode in said resonator being greater than about 1.3.

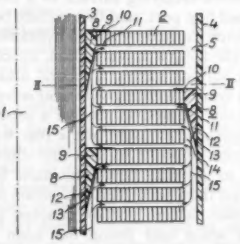
4,028,653
ELECTRICAL EQUIPMENT HAVING RADIAL COOLING CHANNELS WITH MEANS FOR GUIDING COOLING FLUID THROUGH THE CHANNELS

Tage Carlsson, and Wolfgang Lampe, both of Ludvika, Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden

Filed Apr. 1, 1976, Ser. No. 672,718

Int. Cl.² H01F *27/08*

U.S. Cl. 336—60 **3 Claims**



1. In electrical equipment having inner and outer insulating cylinders and a winding between the cylinders having a plurality of passages therethrough axially spaced with respect to the cylinders for passage therethrough of a cooling fluid, the winding being separated from one of the cylinders by a space, and a cooling fluid guide member in said space having first and second surfaces and having an enlarged head filling the space, said head including upper and lower flanges engaging a layer of said winding for securing said guide member to the winding, one of said surfaces engaging against the cylinder, and having a wedge-formed projection extending axially from the head with respect to the cylinders by a distance at least equal to the axial distance between two of said passages, said projection having the second surface forming with the winding a space decreasing in area towards the head, whereby the flow of cooling fluid is distributed between such passages.

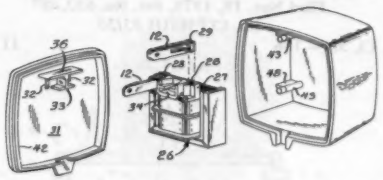
4,028,654
BATTERY CHARGER

Robert G. Bullard, Odell; James P. Plunkett, W. Dundee, and George F. Linning, Des Plaines, all of Ill., assignors to Coils, Inc., Huntley, Ill.

Continuation-in-part of Ser. No. 409,958, Oct. 26, 1973, abandoned. This application Jan. 7, 1976, Ser. No. 646,952

Int. Cl.² H01F *15/10*

U.S. Cl. 336—92 **10 Claims**



1. A voltage-reducing power pack including a case with a base plate having openings therein; a transformer in the case having a bobbin molded of one piece with a mounting head, said mounting head having a pair of spaced, parallel elongated slots therein; a pair of plug-in prongs having shanks respectively received edgewise in said slots; interlocking means between said mounting head and plug-in prongs preventing endwise movement of said prongs when in said slots; sturdy interlocking formations on said base plate and mounting head telescoping together as the plug-in prongs are threaded through said openings in said base plate to project normally for rigidifying the bobbin and the prongs with respect to the base plate; panel means extending from said base plate across open ends of said slots to retain said prongs in said slots; and a cover secured to the base plate and having formations thereon which engage the transformer structure in the direction of its insertion into the base plate to prevent detelescopic movement of said interlocking formations.

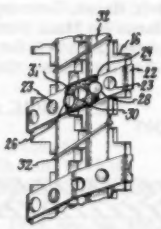
4,028,655
ELECTRICAL CURRENT LIMITING FUSE WITH BOUND SAND FILLER AND IMPROVED LOW CURRENT FAULT CLEARING

Robert E. Koch, Pittsfield, Mass., assignor to General Electric Company

Filed Oct. 9, 1975, Ser. No. 621,060

Int. Cl.² H01H *85/10*

U.S. Cl. 337—160 **8 Claims**



1. An electrical current limiting fuse of the type having an insulating tubular casing sealed at the ends by metal terminal

caps, at least one fusible element connected between the terminal caps and extending along the interior of the casing, and a bound matrix of sand packed inside the casing and surrounding the element, wherein the improvement comprises that;

a segment of said element approximately centrally located between said caps comprises one or more reduced surface area necks which are in addition to any regularly spaced reduced cross-section necks of said element, and

an overlay of metal having a lower fusing temperature than said element on the surface of said segment.

4,028,656

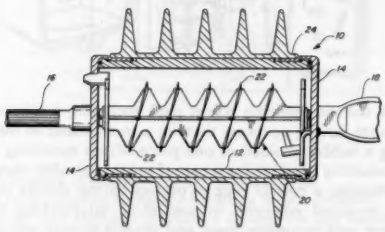
HIGH VOLTAGE FUSE WITH OUTER HEAT-SHRINKABLE SLEEVE

E. William Schmunk, Park Ridge, and Thomas J. Tobin, Morton Grove, both of Ill., assignors to S & C Electric Company, Chicago, Ill.

Filed Nov. 19, 1975, Ser. No. 633,487

Int. Cl.² H01H *85/20*

U.S. Cl. 337—186 **11 Claims**



1. In a high voltage current limiting fuse, the fuse including a relatively short hollow cylindrical housing fabricated from an electrically insulating material, end walls mounted over each end of the housing, a current responsive element positioned within the housing, and means for connecting the current responsive element to an external circuit, said housing being relatively short for the current limiting capabilities of the fuse; wherein the improvement comprises:

a hollow cylindrical sleeve fabricated from an insulating material having a dimensional memory and having surface elongating means formed on the exterior thereof for increasing the external path of the fuse, said sleeve having a coating of thermosetting plastic on the interior surface thereof and being expanded in its radial dimension, positioned around the hollow cylindrical housing and bonded to the housing by causing said sleeve to seek its original radial dimension to form a moisture proof seal therebetween.

4,028,657

DEPOSITED LAYER TYPE THERMOMETRIC RESISTANCE STRUCTURE

Walter G. Reichelt, Hanau, Germany, assignor to W. C. Heraeus GmbH, Hanau am Main, Germany

Filed Oct. 22, 1975, Ser. No. 624,964

Claims priority, application Germany, Oct. 24, 1974, 2450551

Int. Cl.³ H01C *1/012*

U.S. Cl. 338—307 **12 Claims**

1. A thermometric electrical resistance structure comprising a carrier substrate consisting chiefly of aluminum oxide, an intermediate layer on said substrate and a patterned platinum layer of a configuration suitable for use as an electrical resistance provided on said intermediate layer, having the improvement that:

the platinum layer has a thickness in the range from 0.1 to 10 μm,

and the intermediate layer has a thickness in the range from 0.1 to 10 μm and is composed of an oxide material selected from the group consisting of oxides of rare earth elements, titanium oxide, iron oxide and mixtures of at least two of said oxides, whereby said oxide material, by providing electrical and mechanical stability to the structure in manufacturing heat treatment, improves the quality and reliability of the thermometric structure.

4,028,658

SAFETY DEVICE FOR AN OIL HYDRAULIC BRAKING SYSTEM

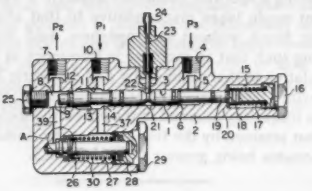
Hiroyuki Nakamura, Gotenba; Hiroshi Kawaguchi, and Kiyoshi Nishiwaki, both of Susono, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Mar. 22, 1974, Ser. No. 453,953

Claims priority, application Japan, Nov. 13, 1973, 48-127454

Int. Cl.² B60T *8/26*

U.S. Cl. 303—6 C **5 Claims**



1. A safety device for an oil hydraulic brake system comprising a housing containing a first bore and a second bore, first, second and third ports opening into said first bore, said first, second and third ports being connected to a front master clinder, and said second and third ports communicating with said second bore through passages formed in said housing, a rear wheel cylinder and a rear master cylinder, respectively, a piston slidably disposed in said first bore, said piston having a first effective pressure-receiving surface of a first area communicating with said first port, said first surface being adapted to receive a first force exerted by the oil hydraulic pressure of the front master cylinder in a first direction, a second effective pressure-receiving surface having a second area larger than said first area and communicating with said second port, said second surface being adapted to receive a second force exerted by the oil hydraulic pressure of the rear wheel cylinder in a second direction opposite to said first direction, a land portion adapted to provide communication between said second port and said third port when said piston is displaced in said second direction, a cam portion adapted to actuate an electrical contact when said piston has been displaced in either direction, a spring adapted to exert a force to said piston in said first direction within a limited stroke, said force being not less than the balance between said second and first forces, and a proportioning means disposed in said second bore and communicating with the rear master cylinder and the rear wheel cylinder through the passages formed in said housing and said second and third ports, said proportioning means adapted to transmit hydraulic pressure of the rear master cylinder to the rear wheel cylinder with a reduced increasing rate when the hydraulic pressure of the rear master cylinder is above a predetermined level.

4,028,659

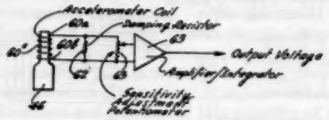
STRONG MOTION ACCELEROGRAPH WITH SELF-STARTER AND ELECTRICAL AS WELL AS LIGHT OUTPUTS

William J. Rihn, San Gabriel, Calif., assignor to Kinemetrics, Inc., San Gabriel, Calif.

Division of Ser. No. 298,536, Oct. 18, 1072, Pat. No. 3,877,256, which is a continuation-in-part of Ser. No. 96,325, Dec. 9, 1970, abandoned. This application July 5, 1974, Ser. No. 485,902

Int. Cl.² G01V *1/18*

U.S. Cl. 340—17 R **1 Claim**



1. Means to produce electrical voltage variations indicative of the intensities of earth tremors in the area in which said means is disposed, and to transmit said voltage variations to a receiving station for recording and observation, said means comprising:

a. a battery power source;

b. a radio frequency transmitter;

c. first switching means, said first switching means being connectedly interposed between said battery power source and said transmitter, and said first switching means having a first and normally set position whereby the flow of current from said battery power source to said transmitter is interdicted, and a second position to which said first switching means may be temporarily switched whereby such current flow may occur thereby to initiate operation of said transmitter;

d. a permanent magnet, said magnet providing a magnetic field about a predetermined axis;

e. a coil of wire, said coil being suspended within said field to oscillate, when jarred, along said axis, and thereby produce a flow of current in said coil;

f. current responsive relay means, the last said means being connected to opposite terminals of said coil and operatively associated with said first switching means in such manner that when current of a predetermined amperage flows in said coil, said switching means is moved from its first to its second position and retained in the latter position for a predetermined interval after current of such predetermined amperage ceases to flow in said coil;

g. second switching means, said second switching means being movable from a normally set first position, to a second position;

h. first resistance element, said first resistance element being normally connected across the opposite terminals of said coil by said second switching means in its first position, to effect electrical damping of oscillations of said coil within said magnetic field until acceleration applied to said coil shall reach a predetermined value, whereupon said first switching means is moved from its first position to its second position;

i. a second resistance element, said second resistance element being connected across the opposite terminals of said coil by said second switching means when in its second position, said second resistance element being of a different ohm value from the first resistance element, thereby to dampen the oscillation of said coil on a lesser basis than the damping effected by the first resistance element; and

j. amplifier integrator means, the input side of said amplifier integrator means being connected across said second resistance element, and the output side of said amplifier integrator means being connected to the input side of said transmitter, thereby to amplify the voltage variations generated in said coil during any oscillation thereof within said magnetic field when the second switching means is in its second position, and to deliver a current with such variations to the transmitter so that radio frequency signals corresponding to said voltage variations may be transmitted by said transmitter to said receiving station.

4,028,660

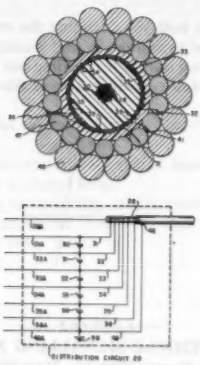
WELL LOGGING METHOD AND MEANS USING AN ARMORED MULTICONDUCTOR COAXIAL CABLE

Robert W. Pitts, Jr., Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Division of Ser. No. 427,156, Dec. 21, 1973, Pat. No. 3,855,468. This application Aug. 5, 1974, Ser. No. 494,577

Int. Cl.² G01V *1/40*

U.S. Cl. 340—18 CM **11 Claims**



1. A well logging system comprising a logging tool adapted to be passed through a borehole in an earth formation, said logging tool includes means for sensing conditions in a borehole and providing at least two signals corresponding to the sensed conditions, one signal having a high frequency and at least one other signal having a low frequency; a transmission system including a shieldless armored multiconductor coaxial cable which comprises an inner conductor, a coaxial first insulator, groups of conductors arranged in a predetermined relationship to said inner conductor and separated from said inner conductor by said first coaxial insulator, means for separating the groups of conductors so as to insulate each conductor group from any other conductor group, a second coaxial insulator, and an outer armor of conductive material separated from said groups of conductors by said second coaxial insulator; the logging tool also includes means connected to the sensing means and to the transmission system for applying the high frequency signal to the inner conductor and to the groups of conductors of the cable and for applying the low frequency signal to one conductor group and to the outer armor of conductive material; and surface electronics adjacent to the borehole for processing the signals transmitted by the transmission system to provide outputs corresponding to the sensed condition.

4,028,661

PAGER SUBSYSTEMS

Thomas J. Mortimer, Amherst, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

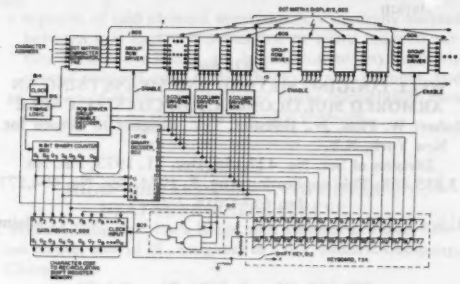
Filed May 22, 1975, Ser. No. 580,092

Int. Cl.² G06F *3/14*

U.S. Cl. 340—324 M **6 Claims**

1. An alpha numeric message encoder including a message

entry keyboard, a memory for storing the message entered from the keyboard, means having columns and rows, the columns of which are sequentially activated by strobing signals for displaying the message stored in the memory, and a



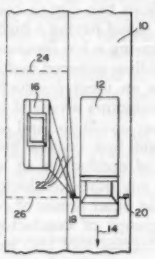
single logic circuit both for decoding the message entered at the keyboard prior to storage in said memory by providing a sequence of strobing signals for reading out the keyboard and for providing the same strobing signals for strobing said display means.

4,028,662

PASSING VEHICLE SIGNALLING APPARATUS

Raymond Donald Young, High St., Meredith, N.H. 03253

Filed May 24, 1976, Ser. No. 689,496
Int. Cl.² G08G 1/00; G01S 9/66
U.S. Cl. 340—32 **6 Claims**



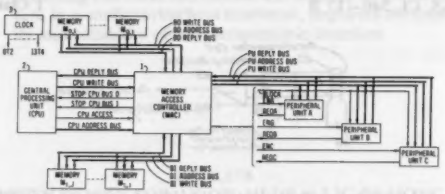
1. A passing vehicle signalling apparatus comprising at least one rearwardly directed range detecting apparatus affixed outwardly and along one side of a first vehicle, said range detecting apparatus for detecting the presence of a second vehicle adjacent to and disposed rearwardly a maximum distance from said range detecting apparatus when said second vehicle is disposed outwardly from said one side of said first vehicle, maximum distance adjustment means for manufally adjusting said maximum distance, alarm means for signalling the presence of said second vehicle within said maximum distance, switch means for selectively operating said range detecting apparatus, timing means for permitting said range detecting apparatus to remain operative for a pre-set maximum period of time, said pre-set maximum period of time being capable of being foreshortened when said switch means being manipulated to de-energize said range detecting apparatus.

4,028,663

DIGITAL COMPUTER ARRANGEMENT FOR HIGH SPEED MEMORY ACCESS

Robert Dale Royer, Naperville, and Thomas Frank Schwab, Lisle, both of Ill., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 5, 1974, Ser. No. 476,435
Int. Cl.² G06F 13/00
U.S. Cl. 340—172.5 **15 Claims**



1. A data processing system having a central processor, a plurality of peripheral units arranged in a preassigned priority, a plurality of memories accessible on request by said processor and said units and a memory access controller cooperating with said processor and said units to process conflicting access request for said memories , each one of said units comprising:

timing means startable for generating a first, a second, a third, and a fourth timing signal, each timing signal being generated at a predetermined interval after the start of said timing means;

means responsive to said first timing signal for forwarding to said controller an address designating one of said memories;

means responsive to said second timing signal for sending data from said one unit to said controller; and

means for repetitively generating access requests for said memories, said generating means being responsive to said third timing signal for stopping generation of said access requests;

said memory access controller comprising: a first priority circuit responsive to a first set of access requests generated by said units for starting the timing means in a first unit with the highest priority request in said first set, said set including a single request generated by each unit desiring to access said memories; and

means responsive to an address received from said first unit and to an address received from said processor for sending a blocking signal to stop the timing means in said first unit after said second timing signal is generated and before said third timing signal is generated when said processor and said first unit are requesting simultaneous access to the same memory.

4,028,664

APPARATUS FOR DISPATCHING DATA OF THE HIGHEST PRIORITY PROCESS HAVING THE HIGHEST PRIORITY CHANNEL TO A PROCESSOR

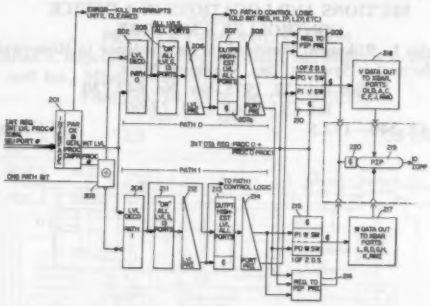
Earnest M. Monahan, Phoenix, and Garvin W. Patterson, Glendale, both of Ariz., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Mar. 26, 1975, Ser. No. 562,314
Int. Cl.² G06F 9/18
U.S. Cl. 340—172.5 **9 Claims**

1. In a data processing system having a system interface unit (SIU), a plurality of peripheral units, a plurality of processors and at least one processor of said plurality of processors executing a first one of a plurality of processes having a first level of priority each of said processes having a priority level based on the relative importance of said plurality of processes, and with any of said processes generating signals for requesting

control of said one processor, said data processing system further including at least one peripheral channel for each one of said peripheral units, each peripheral channel selectivity coupled to said SIU for communication between any one of said peripheral units and said one processor, each peripheral channel having a priority level based on the relative importance of the peripheral unit associated with its peripheral channel, and with any of said peripheral channels also generating signals for requesting assignment to said one processor, a dispatcher mechanism in said SIU for dispatching data to said one processor by any one of said requesting processes based on priority of said peripheral channel of said requesting process and the priority of said requesting process, said dispatcher mechanism comprising:

a. a plurality of processor communication channels, one each of said plurality of processors coupled to said SIU via one each of said processor communication channels for communication between said any one of said plurality of processors and any one of said plurality of peripheral units;



b. first means responsive to a request signal indicative that a second process of said plurality of processes has requested control of said one processor, said first means for selecting one of a plurality of said processor communication channels;

c. second means in each of said processor communication channels for determining the highest priority peripheral channel of the highest priority second process of said group of processes generating signals requesting control of said one processor;

d. third means, coupled to said second means and to said one processor, for determining the higher priority level between said first one of said plurality of processes and said highest priority peripheral channel of the highest priority second process;

e. fourth means, coupled to said plurality of processor communication channels and to said third means, for receiving data required to effect the transfer of control from said first one of said processes to said second process; and

f. fifth means, coupled to said fourth means, for dispatching the data from the highest priority peripheral channel of the highest priority second process to said one processor.

4,028,665
INFORMATION STORE SYSTEM COMPRISING A PLURALITY OF DIFFERENT SHIFT-REGISTERS

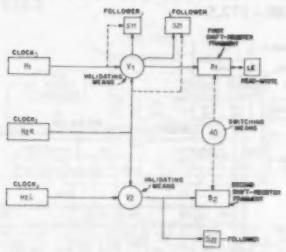
Joseph Nageeb Tasso, 18 rue de la Glaciere, 75013 Paris, France

Filed June 3, 1975, Ser. No. 583,402
Claims priority, application France, June 7, 1974, 74.19818
Int. Cl.² G06F *13/02*
U.S. Cl. 340—172.5 **11 Claims**

1. For a program controlled information processing system operating on multi-data blocks, a large capacity store comprising:

a plurality of addressable memory sections, each having simultaneously controllable bit shift-registers equal in number to the number of bits in a data block to constitute a data-block shift-register of addressable block line positions and being individually controllable for a step by step operation;

each said data block shift-register in a memory section being comprised of elementary block shift-registers or fragments having different characteristics, those fragments being selectively serially connectable or adapted to be looped;



read-write means associated with at least one of said fragments;

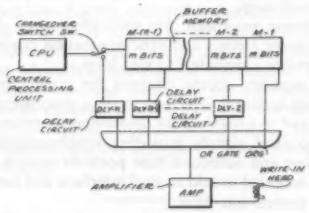
closing means associated with said at least one fragment in order to form a closed loop;

switching and synchronizing means provided in order to form an overall closed loop with said at least one fragment and the other ones.

4,028,666
DATA TRANSFER SYSTEM

Masao Suzuki, Yokohama, and Kunitoshi Moriya, Kawasaki, both of Japan, assignors to Fujitsu Ltd., Kawasaki, Japan

Filed Oct. 29, 1975, Ser. No. 626,642
Claims priority, application Japan, Oct. 31, 1974, 49-126133
Int. Cl.² G06F *7/00*
U.S. Cl. 340—172.5 **8 Claims**



1. A data transfer system for receiving incoming digital data serially at a predetermined bit rate and transferring said data serially at a different bit rate, said data transfer system comprising

distributing means for distributing the bits of incoming data into a plurality of groups;

delay means connected to the distributing means for delaying the bits of each group by predetermined delay times;

assembly means connected to the distributing means and the delay means for assembling the delayed bits of each group into a group having a bit rate different from that of the incoming data; and

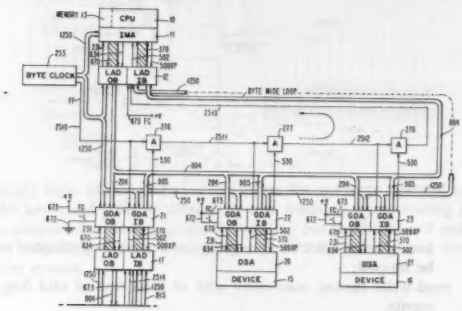
an output coupled to the assembly means.

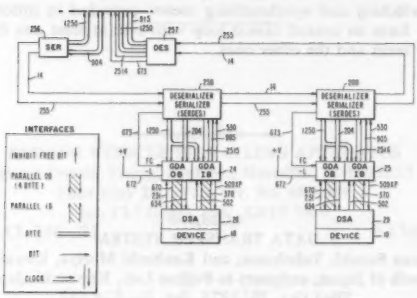
4,028,667

ASYNCHRONOUS, HIERARCHICAL LOOP COMMUNICATION SYSTEM WITH INDEPENDENT LOCAL STATION CONTROL OF ACCESS TO INBOUND TIME PORTIONS WITHOUT CENTRAL CONTROL

Franklin Charles Breslau, Teaneck, N.J., and Gerald Goertzel, White Plains, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,711
Int. Cl.² H04J *3/08*; G06F *3/04*
U.S. Cl. 340—172.5 **13 Claims**





1. A loop data communication system including a loop comprising a transmission medium having an input end and an output end, a central loop terminal interface connected to send data into said input end and to receive data from said output end of said loop,

a message frame generator for generating time division multiplex frame timing and synchronization control signals for devices connected to said loop,

an indirect memory access channel for connecting said central loop terminal interface to data processing hardware adapted to provide data demanded therefrom,

said frame control signals providing synchronization for inbound time and outbound time portions in each frame, for signals inbound to said central interface and outbound from said central interface,

a plurality of interface stations adapted for coupling data processing equipment to said loop for message communication with said access channel, said stations being connected to said loop,

said message frame generator always generating with each frame a free frame signal designating a free inbound time portion without addressing said signal to any specific interface station indicating the availability of said frame for an interface station on a first come, first serve basis,

means adapted for coupling said free frame signal to each of said interface stations in series upon said loop on a one-at-a-time sequential basis,

seizure means associated with each of said interface stations responsive to a free frame signal for seizing a free inbound time portion appearing at any one of said interface stations without first sending a signal to said central interface effective to assign the corresponding inbound time portion of a frame to said interface station associated therewith in response to a free frame signal and to activate said station to send a message on said free inbound time portion to said central interface and to block communication of said free frame signal by said means adapted for coupling to an interface station downstream from said station having seized said frame, and

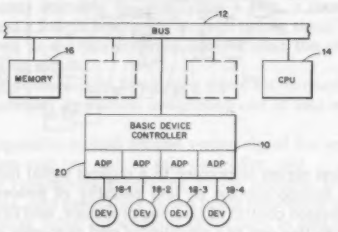
said central interface having no control over the allocation of access to send messages on said free inbound time portions of frames by said interface stations, but said control over allocation being maintained exclusively by each of said seizure means independently of said central interface or any other interface station and equipment related thereto on a first come, first serve basis.

4,028,668

APPARATUS FOR SELECTIVELY ADDRESSING SECTIONS AND LOCATIONS IN A DEVICE CONTROLLER'S MEMORY

Douglas L. Riikonen, Westford, Mass., assignor to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Dec. 22, 1975, Ser. No. 643,730
Int. Cl.² G06F *3/04*, *13/00*
U.S. Cl. 340—172.5 **15 Claims**



1. In a data processing system comprising a data processing unit, a controller unit for interfacing a plurality of peripheral devices with an electrical bus, only one of which may be active at any given time, and said electrical bus for transferring information between said units; said controller unit including;

A. apparatus for enabling the control and operation of said device, only one of said devices being controlled by said controller unit at any given time, the one of said devices being controlled hereinafter referred to as the active device;

B. means, responsive to said apparatus for enabling, for storing information relating to the control, operation and status of said devices, said means for storing including a plurality of sections equal in number to the potential number of said devices, each of said sections having a unique section address, and each of said sections including a plurality of locations for storing its associated device's information relating to the control, operation and status thereof, each of said sections having the same topology of said information in the respective locations thereof;

C. means for indicating the identity of said active device;

D. first means, responsive to said apparatus for enabling, for computing the address of one of said locations, said first means for computing also including further means for computing the address of one of said sections independent of the identity of the active device so that a said device which is not said active device may have the contents of its corresponding said section updated;

E. means, responsive to the indication of the identity of said active device, for generating the address of the one of said sections corresponding to said active device;

F. means for addressing said locations with the address computed by said first means for computing;

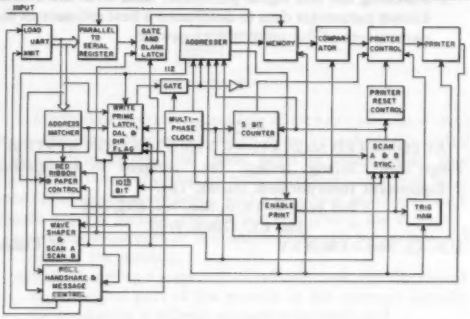
G. means for generating a select signal if a said device, which is not said active device, is to have the contents of its corresponding said section updated; and

H. means for selecting either said section address computed by said further means for computing if said select signal is generated or said section address generated by said means for generating if said select signal is not generated, for addressing one of said sections.

4,028,669
PRINTER CONTROL SYSTEM

Carlos S. Higashide, Elk Grove Village, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 19, 1976, Ser. No. 650,230
Int. Cl.² G06F *3/12*
U.S. Cl. 340—172.5 28 Claims



1. A printer control system for a rotary drum printer for printing data, said data comprising bits divided into characters to be printed, said rotary drum printer having a plurality of columns of characters distributed in rows therealong for printing said characters of data and having hammers associated with each column being controlled by said system, said system comprising:

storage means for receiving and storing said data;

drum trace means for providing a drum trace signal dependent upon a position of said drum;

comparator means connected to both said storage means and said drum trace means for comparing said data, a character at a time, to said drum trace signal and for providing a match signal when there is a match of said data character and said drum position and a non-match signal where there is no match;

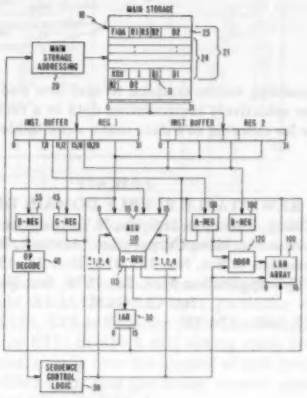
serial shift register means for shifting and storing match and non-match signals, including a serial shift register and means for supplying to said shift register a column finish signal before a comparison operation is started and for supplying said column finish signal out of said serial shift register when said serial shift register is full of match and non-match signals and means responsive to said column finish signal for terminating said comparison operation; and,

trigger means responsive to said match signals stored in said serial shift register for firing only those hammers corresponding to said match signals after all characters, stored in said storage means, have been compared with said drum position.

4,028,670
FETCH INSTRUCTION FOR OPERAND ADDRESS CALCULATION

Roy Louis Hoffman, Pine Island; William George Kempke, and Frank Gerald Soltis, both of Rochester, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 6, 1976, Ser. No. 655,646
Int. Cl.² G06F *9/06*
U.S. Cl. 340—172.5 6 Claims



1. In a computer system having storage for storing executable and non-directly executable instructions and operands, said directly executable instructions including for every non-directly executable instruction a predetermined directly executable instruction having bit fields for performing instruction fetch phase and operand address calculation for an associated non-directly executable instruction, and a central processing unit for fetching and executing instructions from storage, the improvement comprising:

identifying means within said central processing unit for identifying non-directly executable instructions fetched from storage,

means responsive to said identifying means indentifying a non-directly executable instruction for retrieving from storage an associated predetermined directly executable instruction having bit fields for performing instruction fetch phase and operand address calculation of said identified non-directly executable instruction, and

means responsive to bits in said bit fields of said fetched predetermined directly executable instruction to re-fetch said identified non-directly executable instruction, to compute operand addresses for operands in said non-directly executable instruction as specified in said predetermined directly executable instruction and to store said computed operand addresses to facilitate retrieval of said operands.

4,028,671
CHARGE COUPLED STORAGE DEVICE MULTIPLEXER

George S. Leach, Jr., Phoenix, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Oct. 6, 1975, Ser. No. 620,089
Int. Cl.² G11C *11/40*
U.S. Cl. 340—173 R 8 Claims

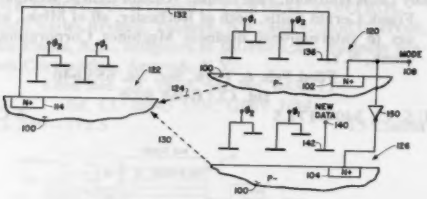
1. A charge coupled device memory having a plurality of charge coupled device stages comprising:

a. a semiconductor substrate,

b. a first and second separated region of a first conductivity type disposed in said substrate each forming respectively a portion of a pair of input stages,

c. a third region of first conductivity type disposed in said

substrate forming a portion of another stage, and said another stage being coupled to both input stages through a plurality of other charge coupled device stages, and



d. enabling means coupled to said first and second regions for selectively recirculating data in a recirculating mode or for entering new data into a write mode of the memory.

4,028,672

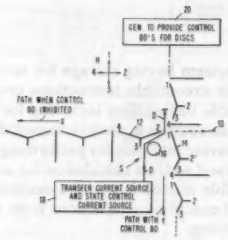
REWRITABLE BUBBLE DOMAIN DECODER

Hsu Chang, Yorktown Heights, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 429,411, Dec. 28, 1973, abandoned. This application Mar. 24, 1976, Ser. No. 669,778

Int. Cl.² G11C *11/14*

U.S. Cl. 340—174 TF **14 Claims**



1. A rewritable bubble domain decoder for moving magnetic bubble domains in selected propagation paths in a magnetic medium, comprising:

propagation means defining a plurality of said propagation paths for said bubble domains,

rewritable switch means located adjacent to said propagation means for determining the path of said bubble domains in said magnetic medium, said switch exhibiting two stable states each of which is characterized by a different preferred propagation path,

control means for changing the state of said switch and further means for overriding one of said preferred paths when said switch is maintained in the state corresponding to said one preferred path.

4,028,673

CROSSWIND MEASUREMENTS THROUGH PATTERN RECOGNITION TECHNIQUES

Fredrick J. Taylor, Cincinnati, Ohio; Jack Smith, and Thomas H. Pries, both of El Paso, Tex., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 31, 1975, Ser. No. 627,631

Int. Cl.² G06K *9/00*

U.S. Cl. 340—146.3 R **5 Claims**

1. A pattern recognition method for measuring crosswind parameters comprising the steps of:

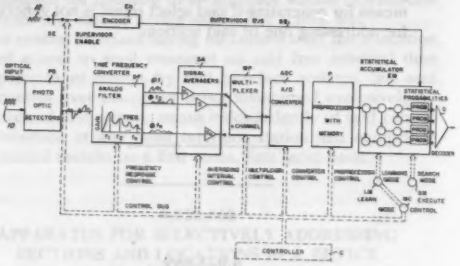
a. generating a spectral profile signal of an optical radiation beam passing through a plurality of crosswinds having known parameters;

b. dividing said spectral profile signals for each known crosswind into selected frequency components;

c. averaging said frequency components over a selected period of time;

d. digitizing said selected and averaged frequency components;

e. classifying the digitized frequency components in accordance with crosswind parameters of interest;



f. storing said classified frequency components as digital retrievable data in a memory;

g. generating a test spectral profile signal of said optical beam passing through crosswind of unknown parameters;

h. performing steps (b) to (f) on said test signal; and

i. matching the test signal parameter data with the closest known parameter data to determine a best estimate of the parameters of the unknown crosswind.

4,028,674

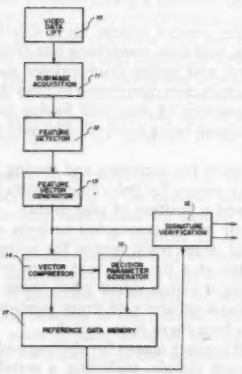
AUTOMATED SIGNATURE VERIFICATION SYSTEM

Ping-Chien Chuang, Irving, Tex., assignor to Recognition Equipment Incorporated, Dallas, Tex.

Filed June 4, 1976, Ser. No. 692,768

Int. Cl.² G06K *9/00*

U.S. Cl. 340—146.3 SY **16 Claims**



1. A method of identifying an authorized signature, which comprises:

a. optically electrical images representative of multiple authorized signatures;

b. scanning said electrical images to locate signature peaks in said authorized signatures;

c. forming feature sets representative of said authorized signatures;

d. forming from said feature sets a composite feature set;

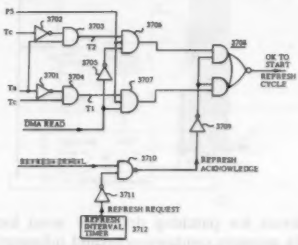
e. assigning weights to said composite feature set;

f. forming a decision threshold from said weights and said composite feature set;
g. collecting said decision threshold, said weights and said composite feature set to form a reference data set;
h. repeating steps (a) through (c) for an unauthenticated signature; and
i. comparing said reference data set with feature sets of said unauthenticated signature.

4,028,675
METHOD AND APPARATUS FOR REFRESHING SEMICONDUCTOR MEMORIES IN MULTI-PORT AND MULTI-MODULE MEMORY SYSTEM

Robert J. Frankenberg, San Jose, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed May 14, 1973, Ser. No. 360,286
Int. Cl.² G06F *9/18*; G11C *7/00*
U.S. Cl. 340—172.5 **9 Claims**



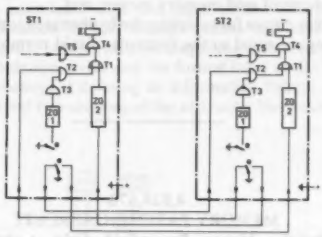
1. Method of operating a module of memory circuits with at least two data processors which may be selectively gated thereto through separate signal ports of the module, said memory circuits requiring periodic refreshing of stored logic manifestations in accordance with a sequence of refresh clock signals applied thereto, the method comprising the steps of:
providing sequences of refresh clock signals for each signal port of the module;
selectively gating a sequence of refresh clock signals present at one signal port of the module to the memory circuits for producing a refresh operation thereof; and
preserving an indication of the occurrences of the refresh operations performed on the memory circuits of the module independently of the signal port thereof through which the sequence of refresh clock signals for each such refresh operation is selectively gated for preserving an indication of the status of memory refresh operations as the signal ports are selectively gated.

4,028,676
CONTROL OF PERIPHERAL APPARATUS IN TELECOMMUNICATION

Gerhard Wolfer, Oberengstringen, Switzerland, assignor to Siemens-Albis Aktiengesellschaft, Zurich, Switzerland

Continuation of Ser. No. 603,486, Aug. 11, 1975, abandoned. This application Apr. 8, 1976, Ser. No. 675,091
Claims priority, application Switzerland, Aug. 22, 1974, 011480/74
Int. Cl.² H04Q *9/00*; H01M *3/00*
U.S. Cl. 340—147 SC **23 Claims**

1. In a method of controlling peripheral units (P1–P20) in a telecommunication system by means of two or more like control apparatus (ST1, ST2, ST3), wherein the peripheral units (P1–P20) are assembled in groups (P1–P5, P6–P10, P11–P15, P16–P20) each of which is associated with its own switching means (S1, S2, S3 or S4) for selectively connecting the particular group (P1–P5, P6–P10, P11–P15 or P16–P20) to a control apparatus (ST1, ST2 or ST3), the improvement comprising in combination the steps of:
effecting the control of all peripheral units (P1–P20) to be controlled at a given time with only one of said like control apparatus (ST1, ST2 or ST3) at that time;
causing each active control apparatus (ST1, ST2 or ST3) to time itself for a first predetermined time as to the duration of its control of said peripheral units (P1–P20), and to initiate a timing cycle in another one of said control apparatus (ST2, ST3 or ST1) for a second predetermined time longer than said first predetermined time;

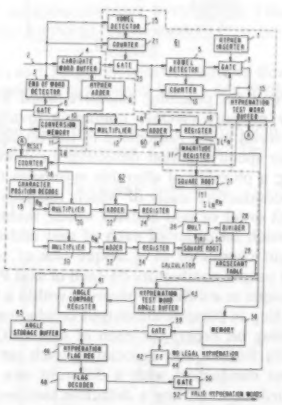


periodically exchanging the control apparatus (ST1, ST2, ST3) in their control function in response to said self-timing; and
causing in response to a malfunction during the performance of said control function by a particular control apparatus (ST1, ST2 or ST3) the other control apparatus (ST2, ST3 or ST1) in which said timing cycle has then been initiated, to take over the control of said peripheral units (P1–P20) from said particular control apparatus (ST1, ST2 or ST3).

4,028,677
DIGITAL REFERENCE HYPHENATION MATRIX APPARATUS FOR AUTOMATICALLY FORMING HYPHENATED WORDS

Walter Steven Rosenbaum, Silver Spring, Md., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed July 16, 1975, Ser. No. 596,337
Int. Cl.² G06F *5/00*; G06K *15/18*
U.S. Cl. 340—172.5 **5 Claims**



1. Apparatus for the automatic hyphenation of alpha words comprising:
buffer means for receiving a word to be hyphenated;
test word generator means connected to said buffer means for forming a set of hyphenated test words from the received word;
conversion means connected to said test word generator

means for converting said set of hyphenated test words into a set of vectors having a common magnitude and a plurality of absolutely unique angles;

memory means containing vector representations for the set of legal hyphenations for a predetermined dictionary of words;

comparison means connected to said conversion means and said memory means for comparing the vector representations for the set of hyphenated test words against the contents of said memory means; and

selection means for selecting the hyphenated test words that compare equal to the contents of said memory means.

4,028,678

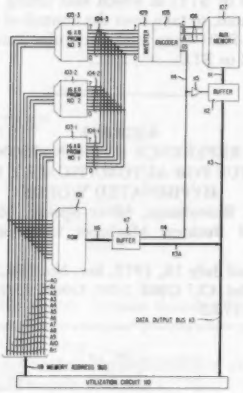
MEMORY PATCHING CIRCUIT

John Christian Moran, Broomfield, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 16, 1975, Ser. No. 623,133

Int. Cl.² G06F *13/00*

U.S. Cl. 340—172.5 **10 Claims**



1. A circuit for patching defective word locations of an unalterable memory (ROM) contaning invalid information with said circuit being responsive to the receipt of ROM address words specifying said defective locations, said circuit comprising; a plurality of alterable memories (PROMs) having input conductors each of which receives the bit for a different bit order of said address words, means for applying the bit in each bit order of each of said address words to a unique input conductor of a unique one of said PROMs, a plurality of output conductors on each of said PROMs each of which is unique to a different bit order within a PROM, means for connecting in parallel the output conductors representing corresponding bit orders for each of said PROMs, means in said PROMs for uniquely associating each set of said paralleled output conductors with a different one of said ROM address words representing a defective location, said PROMs being jointly responsive to the receipt of each address word specifying a defective ROM location to apply a patch signal to the set of paralleled output conductors uniquely associated with said specified defective location, an auxiliary memory, and means responsive to said patch signal for controlling said auxiliary memory to output valid program information as a substitute for that stored in said specified defective ROM location.

4,028,679

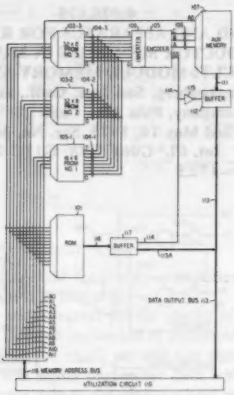
MEMORY PATCHING CIRCUIT WITH INCREASED CAPABILITY

Charles Hamman Divine, Thornton, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 16, 1975, Ser. No. 622,938

Int. Cl.² G06F *13/00*

U.S. Cl. 340—172.5 **9 Claims**



1. A circuit for patching defective word locations of an unalterable memory containing invalid information with said circuit being responsive to the receipt of ROM address words specifying said defective locations, said circuit comprising; a plurality of alterable mmemories having address inputs, means for applying n bits of said address words to n different inputs on said PROMs taken collectively, means for applying each one of the remainder of the bits of said address words to a different input of each one of said PROMs, a plurality of output conductors on said PROMs each of which corresponds to a different bit order within a PROM, means for connecting in parallel the output conductors representing corresponding bit orders for each of said PROMs, means in said PROMs for uniquely associating each set of said paralled output conductors with a unique combination of said defective locations with each location being associated with only a single set, said PROMs being responsive to the receipt of an address word specifying a defective ROM location to apply a path signal to the one set of said output conductors associated with said specified location, an auxiliary memory, encoder means responsive to said patch signal for applying encoded address information to said auxiliary memory, and means for applying said remainder of said address bits for said specified location to said auxiliary memory, said auxiliary memory being responsive to the concurrent receipt of said encoded address information and said remainder of said address bits for generating valid program information as a substitute for that stored in said specified defective ROM location.

4,028,680

SYSTEM FOR AUTOMATICALLY PROCESSING AND PRINTING THE CONTENTS AND THE FORMAT OF A TEXT

Vittore Vittorelli, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Continuation of Ser. No. 494,641, Aug. 5, 1974, which is a continuation of Ser. No. 291,145, Sept. 5, 1972, abandoned. This application May 14, 1975, Ser. No. 577,519

Claims priority, application Italy, Sept. 29, 1971, 70186/71; Apr. 19, 1972, 68214/72; July 14, 1972, 69276/72

Int. Cl.² B41J *5/46, 19/00;* **G06F** *9/16*

U.S. Cl. 340—172.5 **12 Claims**

1. A system for automatically processing and printing the

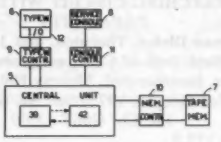
contents and the format of a text of lines of characters, the system comprising:

input means for developing character codes corresponding to desired characters to be entered into the system on a line-by-line basis;

printing means receptive of character codes for printing characters in character lines each line having a maximum predetermined length;

storage means receptive of character codes for storing each of the codes associated with entered character lines into one of a plurality of storage blocks and including means for reading out each storage block to apply the character codes therein to the printing means for the printing of same, each block having a capacity for storing the code of one character line of said maximum predetermined length; and

actuatable control means associated with said input means for controlling the operation of said storage means and said printing means to effect the reading of character



codes from the storage blocks and the printing of same by the printing means, said control code of a given storage block with the second service character code of said given storage block and character codes recordable in each block and for developing a first service character code corresponding thereto, means operable with said input means for controlling said storage means to store the first service character code in each of said blocks, means responsive to each character code entered by said input means in each character line for developing a second service character code for each block corresponding to the number of character codes entered in the associated line, first comparison means for comparing the first service character code with said second service character code and print control means responsive to said first comparison means for effecting the printing of said given storage block by said printing means when the first service character code thereof is equal to the second service character code thereof.

4,028,681

SYSTEM FOR AUTOMATICALLY PROCESSING AND PRINTING THE CONTENTS AND THE FORMAT OF A TEXT

Vittore Vittorelli, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Continuation of Ser. No. 494,641, Aug. 5, 1974, which is a continuation of Ser. No. 291,145, Sept. 5, 1972, abandoned. This application May 14, 1975, Ser. No. 577,520

Claims priority, application Italy, Sept. 29, 1971, 70186/71; Apr. 19, 1972, 68214/72; July 14, 1972, 69276/72

Int. Cl.[2] B41J *5/46, 19/00;* **G06F** *9/16*

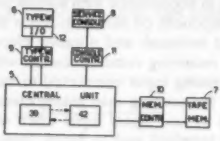
U.S. Cl. 340—172.5 **9 Claims**

1. A system for automatically recording and searching information comprising:

input means for developing character codes corresponding to desired characters to be entered into the system in character lines and including means for developing format label codes and tabulation character codes each corresponding to selected points along each character line;

printing means associated with said input means for printing characters in character lines;

storage means associated with said input means for storing entered information in a recording medium and having means defining a plurality of data storage blocks each having a capacity to store a given number of character codes corresonding to one line of characters and including means for reading out each of the storage blocks for applying data therein to the printing means; and control means associated with said input means for controlling the operation of said storage means and said printing means, said control means comprising means receptive of the tabulation codes and the format label codes from the input means for defining an information format comprising at least two sections of the character line, each section



for one different class of information to be entered by said input means with each class of information corresponding in position in the character line to its associated section and wherein each section has a starting point in the character line corresponding to one tabulation code and has a selectable fixed length corresponding to the length of one format label code, means for effecting storage of the tabulation and label codes in a predetermined storage block and means responsive to the codes to the information format stored in said predetermined storage block for controlling said storage unit to effect the storage of entered information of said two classes of information in the corresponding sections in each of the remaining storage blocks corresponding to the sections of the character line.

4,028,682

CIRCUIT ARRANGEMENT FOR SELECTING THE FUNCTION OF CONNECTION CONTACTS ON CIRCUIT CHIPS

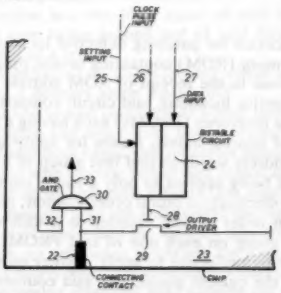
Gerald Weber, and Jurgen Sorgenfrei, both of Braunschweig, Germany, assignors to Olympia Werke AG, Wilhelmshaven, Germany

Filed Dec. 20, 1974, Ser. No. 535,090

Claims priority, application Germany, Dec. 22, 1973, 2364253

Int. Cl.[2] G06F *3/00, 9/00*

U.S. Cl. 340—172.5 **3 Claims**



1. In a circuit arrangement of at least one highly integrated chip for a microprogrammed data processing device asso-

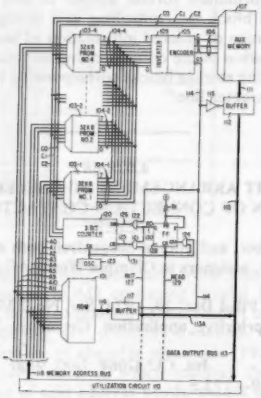
ciated with peripheral units, the chip containing circuit components, the arrangement further including connecting contacts on the chip connecting circuit components thereon to the peripheral units for transfer of signals therebetween, the improvement comprising selecting means connected to said contacts for connecting each said contact to constitute either an input or an output terminal under the control of the microprogram contained in the ROM, said selecting means including, for each said connecting contact: a bistable circuit on the chip on which its respective contact is located and having an output in signal transmitting communication with said connecting contact such that a signal corresponding to the logic state of said bistable circuit is continually applied to said connecting contact, said bistable circuit being connected to be set and reset by the microprogram for maintaining said bistable circuit in a selected logic state when said contact constitutes an input terminal and controlling the logic state of said bistable circuit in accordance with signals produced by at least one circuit component on said chip when said contact constitutes an output terminal; and a gating circuit having a signal input in signal receiving communication with said connecting contact and a gating input connected to be controlled by the microprogram for causing said gating circuit to transmit signals present at its said signal input when said contact constitutes an input terminal and to block transmission of signals present at said signal input when said contact constitutes an output terminal.

4,028,683

MEMORY PATCHING CIRCUIT WITH COUNTER

Charles Hamman Divine, Thornton, and John Francis O'Neill, Boulder, both of Colo., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 16, 1975, Ser. No. 622,939
Int. Cl.² G06F *13/00*
U.S. Cl. 340—172.5 **14 Claims**



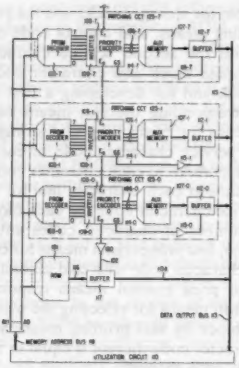
1. A circuit for patching defective locations of an unalterable memory (ROM) containing invalid program information in response to the receipt of ROM address words specifying said defective locations, said circuit comprising; a plurality of alterable memories (PROMs) each having a first and a second group of address inputs, means for applying the bits of said ROM address words to said first group of PROM inputs with each bit being applied to only a single input of said PROMs taken collectively, a plural order counter, means for connecting each order of said counter to a different input of said second group on each one of said PROMs, said connecting means being effective to apply counter output signals representing the current position of said counter to the inputs of said second group, a plurality of output conductors on each of said PROMs each of which corresponds to a different bit order within a PROM, means for connecting in parallel the output conductors representing corresponding bit orders for each of said PROMs, means in said PROMs for associating each set of said paralleled output conductors with a unique combination of said defective locations with each location being associated with only a single set, said PROMs being responsive to the concurrent receipt of an address word specifying a defective ROM location and to said counter output signals to apply a patch signal to the one set of said output conductors associated with said specified location, an auxiliary memory, an encoder responsive to said patch signal for applying encoded address information to said auxiliary memory, and means for applying said counter output signals to said auxiliary memory, said auxiliary memory being responsive to said encoded address information and said counter output signals for generating valid program information as a substitute for that stored in said specified defective ROM location.

4,028,684

MEMORY PATCHING CIRCUIT WITH REPATCHING CAPABILITY

Charles Hamman Divine, Thornton, and John Christian Moran, Broomfield, both of Colo., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 16, 1975, Ser. No. 622,940
Int. Cl.² G06F *13/00*
U.S. Cl. 340—172.5 **15 Claims**



1. A circuit for patching and repatching defective word locations of an unalterable memory (ROM) containing invalid information with said circuit being responsive to the receipt of address words specifying said defective ROM locations, said circuit comprising; an alterable memory (PROM) decoder having inputs for receiving said ROM address words, a plurality of outputs on said decoder, means in said decoder for associating said each one of said defective ROM locations with different ones of said outputs with the address word for at least one of said locations being associated with a plurality of said outputs, said decoder being responsive to the receipt of the address word specifying said one defective ROM location for applying a patch signal to each of said outputs associated with said word for said one location, a priority encoder having inputs arranged in a predetermined order of preference with each input being individually connected to a different one of said decoder outputs, said encoder being responsive to the simultaneous receipt of a patch signal on a plurality of said inputs for encoding only the patch signal on the most preferred one of said inputs that receives a patch signal into address information, an auxiliary memory, and means for applying said encoded address information to said auxiliary

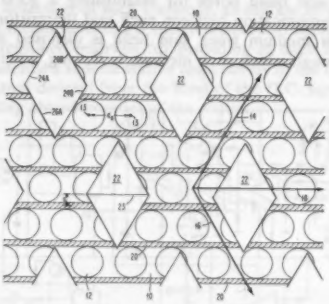
memory for generating valid program information as a substitute for that stored in said one defective ROM location.

4,028,685

FIELD ACCESS PROPAGATION OF BUBBLE LATTICE

John Scott Eggenberger, Los Altos, and Otto Voegeli, San Jose, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 15, 1975, Ser. No. 640,510
Int. Cl.² G11C 11/14
U.S. Cl. 340—174 TF 10 Claims



1. The combination of a bubble lattice having three principal axes and a rotating field access pattern suitable for the translation of bubbles, said pattern comprising

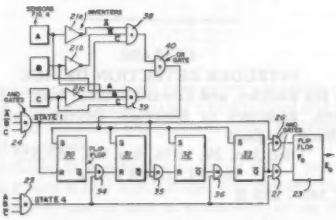
a set of diamond shaped magnetic elements wherein the forces from said elements generated by the application of a rotating in-plane magnetic field will combine with the magnetostatic bubble-bubble interaction forces in the lattice to move the bubbles along a first principal axis of the lattice.

4,028,686

DIGITAL DETECTOR

Michael A. Wilson, and Gordon E. Gee, both of Sarasota, Fla., assignors to Electro Corporation, Sarasota, Fla.

Continuation of Ser. No. 359,463, May 11, 1973. This application May 10, 1976, Ser. No. 684,564
Int. Cl.² G08B 21/00; G01P 3/48, 3/54
U.S. Cl. 340—195 3 Claims



1. In a speed detector for a rotary member having:

an element with an annular array of alternate slots and teeth of magnetic material,

an odd plurality of magnetic sensor means operably associated with said array of slots and teeth and responsive to relative motion between the array and sensor means,

circuit means to develop alternate digital 1 and 0 outputs from each sensor means, each sensor means being displaced from the other sensor means with respect to the slots and teeth whereby during relative motion the instantaneous outputs of the circuit means have a plurality of sequential states and there is at least one state of the circuit means outputs which does not occur during relative motion but does occur in the absence of such motion,

an AND gate having inputs connected with said circuit means and responsive to one of said plurality of sequential output states to generate a repetitive motion-indicating signal, and

an output circuit actuated by the motion-indicating signal from said AND gate to provide a measure of speed,

an improved inhibiting means for said output circuit, comprising:

an AND gate having inputs connected with the outputs of said circuit means and responsive to said one state of circuit means outputs which does not occur during the motion of the array to generate a fault signal;

means responsive to said fault signal for inhibiting operation of said output circuit; and

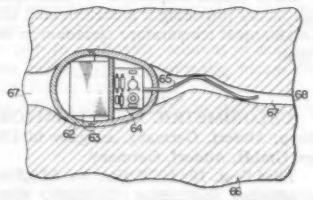
means responsive to repetitive occurrence of one of said plurality of sequential states subsequent to the generation of a fault signal, to enable said output means.

4,028,687

METHOD AND APPARATUS FOR DELIVERY ALARM FOR LIVESTOCK ANIMALS

Sachihiko Hamaguchi; Ikuo Oomura; Tadashi Sato, all of Tokushima, and Hisashi Wada, Takamatsu, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation of Ser. No. 435,245, Jan. 21, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 611,150
Claims priority, application Japan, Feb. 27, 1973, 48-24166; May 17, 1973, 48-55396; May 8, 1973, 48-54391[U]; May 8, 1973, 48-54406[U]; May 15, 1973, 48-57669[U]; May 15, 1973, 48-57670[U]
Int. Cl.² G08B 21/00
U.S. Cl. 340—201 R 6 Claims



1. Apparatus for providing an alarm upon the delivery of a livestock animal, comprising

a case for insertion into the birth canal of said livestock animal, said case being pushed out of said birth canal during delivery of a fetus,

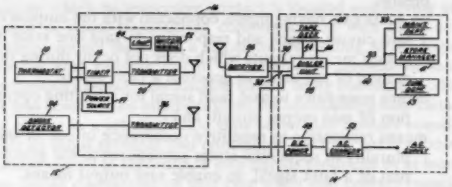
a transmitter including an oscillator located within said case for producing a delivery alarm signal, and

an antenna coupled to said oscillator as a load thereof and extending outside and away from said case and toward the mouth of said birth canal, said oscillator being continuously supplied with electric power and biased such that when the load on said antenna is heavy, the oscillation is substantially stopped near the state where the oscillation is about the start, and when the load on said antenna is relatively high, an oscillation is started; the load on said antenna being heavy when the antenna is within the birth canal, and becoming relatively light causing the antenna to emit a signal from the oscillator when the antenna is pushed out of the birth canal.

4,028,688
REFRIGERATION UNIT AIR TEMPERATURE DETECTION ALARM SYSTEM

Joel B. Goleman, 607 Chelten Hills Drive, Elkins Park, Pa. 19117

Continuation-in-part of Ser. No. 353,340, April 23, 1973. This application Oct. 10, 1975, Ser. No. 621,354
Int. Cl.[2] G08B 21/00
U.S. Cl. 340—227.1 7 Claims



1. An alarm system for a refrigeration unit whose enclosure contains an energy permeable portion, which may be an opening, comprising

a temperature sensing means within the refrigeration unit including a switch device effectively employing a change of state of contacts, opening or closing, for directly sensing air temperature in the refrigeration unit and producing an indication when air temperature reaches or exceeds a predetermined level,

an integrated circuit timer means containing its own power source independent of a general power source required to operate said refrigeration unit, and directly actuated by the contacts of said temperature sensing means when the air temperature in the refrigeration unit reaches or exceeds the predetermined level and terminated and reset when the temperature drops below the predetermined level,

a communication link means employing energy to which said enclosure portion is permeable responsive to said timer means transmitting an actuating signal to initiate the remote alarm means after the timer means has been actuated continuously for a set predetermined time, and

remote alarm means responsive to said communication linkage means providing a predetermined alarm indicating an abnormal temperature condition in the refrigeration unit.

4,028,689
CALORIMETRIC FLOW MONITOR

Hans Schopp, Altdorf, Germany, assignor to Ellenberger & Poensgen GmbH, Altdorf, Germany

Filed Sept. 18, 1975, Ser. No. 614,596
Claims priority, application Germany, Oct. 5, 1974, 2447617
Int. Cl.[2] G01F 1/68; G08B 19/00
U.S. Cl. 340—239 R 7 Claims

1. A calorimetric flow monitor for monitoring the flow of a medium through a pipe, comprising, in combination:

a measuring head including

a metallic sleeve having an external thread via which said head can be tightly screwed into a threaded bore of such pipe in a manner such that one end of the said sleeve is directed toward the medium and the longitudinal axis of said sleeve is perpendicular to that of the pipe,

an insulating block tightly closing the one end of said sleeve and protruding from the one end of said sleeve, said block being provided with two through bores extending in the direction of the length of said sleeve,

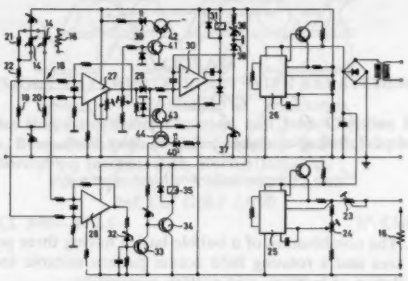
two pins each tightly fitted inot a respective one of said through bores at the end of said block which protrudes from said sleeve, said pins protruding from said block and being of a material having a high thermal conductivity and each said pin being formed to have a blind bore,

first and second tubular, heat conductive sleeves each disposed in a respective one of said blind bores,

first and second thermistors each disposed in a respective one of said blind bores and located within a respective heat conductive sleeve while being insulated therefrom,

a heating coil wound on said first heat conductive sleeve for heating the respective thermistor in said first heat conductive sleeve, and

a casting resin having good heat conductivity filling each of said blind bores for establishing a good thermal communication between each said thermistor and the flow medium when said head is disposed in a pipe through which such medium is flowing, whereby heat



supplied to said first thermistor by said heating coil can be carried off by the medium and said second thermistor can be brought to the temperature of the medium;

means defining an electrical bridge circuit including said thermistors;

first and second differential operational amplifiers each having a pair of inputs connected at selected points of said bridge circuit;

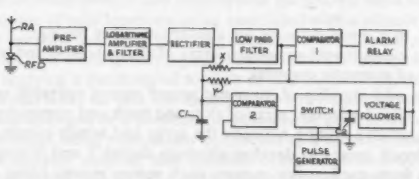
first signal processing means connected to the output of said first differential amplifier for deriving from the output signal therefrom an indication of increases or decreases in the medium flow speed from a predetermined value; and

second signal processing means conducted to the output of said second differential amplifier for deriving from the output signal therefrom an indication of breakages in the connections to said heating coil and said first and second thermistors.

4,028,690
INTRUDER DETECTION DEVICE

Norman Ian Buckley, and Edward Wilson, both of Blackburn, England, assignors to Shorrock Developments Limited, Blackburn, England

Filed Jan. 29, 1976, Ser. No. 653,537
Int. Cl.[2] G08B 13/24
U.S. Cl. 340—258 B 5 Claims



1. A receiver, for an intruder detection system of the kind employing a transmitter to produce a modulated radio frequency emission which is received by a receiver the output

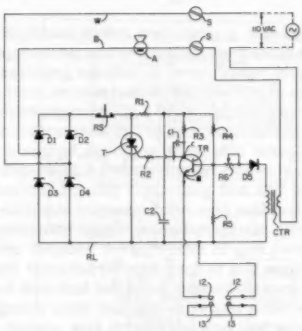
level of which is monitored to detect changes in received signal level indicative of the presence of an intruder in the area between the transmitter and the receiver, the receiver comprising: an aerial, a radio frequency detector to demodulate the signal received by the aerial, signal processing means adapted to provide a D.C. signal the level of which is proportional to the amplitude of the demodulated signal, sampling means adapted to sample the level of said D.C. signal at predetermined intervals of time, detector means connected to the signal processing means via the sampling means to detect a change in the D.C. level greater than a predetermined amount during any one of the predetermined intervals and, in the event of detection of such a change, to initiate an alarm, the sampling means including a switch adapted to open and close at predetermined intervals for providing at each side of the switch potentials representative respectively of the D.C. signal and a datum derived from the level of the D.C. signal during a preceding closed interval of the switch.

4,028,691

THEFT DETERRING APPARATUS

Abraham Zeder, c/o Stajer Corp., 8 Winter Green Circle, Andover, Mass. 01810

Filed Apr. 2, 1976, Ser. No. 673,287
Int. Cl.² G08B *21/00*
U.S. Cl. 340—280 **5 Claims**



1. Electrical appliance theft preventing apparatus usable in connection with appliances having a power cord and plug end plugged into an electrical utility power outlet to define a main circuit and comprising,

means defining an auxiliary d.c. circuit with a gated switch whose gating is in a low voltage, low current, portion of the auxiliary circuit and is controlled by an electrical switch thereby with two (cantilevered) spring contact elements both of which are mounted in common at one end,

means interconnecting the power cord plug and springy contacts to establish one state of opening/closing of the electrical switch contacts when the plug is in the outlet and to change the state when the plug is removed,

means defining an alarm device,

means for activating the alarm device under control of said gated switch in the auxiliary circuit the gating being controlled by said change of state to activate the alarm device,

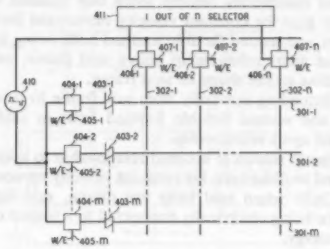
and means separate from said electrical switch for resetting the circuit and deactivating the alarm device.

4,028,692

LIQUID CRYSTAL DISPLAY DEVICE

Peter Dinh-Tuan Ngo, Colts Neck, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 15, 1975, Ser. No. 613,220
Int. Cl.² G02F *1/13;* **H01J** *17/48*
U.S. Cl. 340—324 M **9 Claims**



1. Apparatus comprising

a plurality of capacitive display cells, each comprising first and second conductors and a layer of liquid crystal material and one or more additional layers of dielectric material confined between said conductors,

means for initially storing signals in selected ones of said display cells,

a source for repetitive alternating polarity signals, and

switching means unresponsive to said alternating polarity signals alone but responsive to the sum of said alternating polarity signals with signals of at least a predetermined minimum magnitude stored in said selected display cells for repetitively applying said alternating polarity signals to said selected display cells,

said display cells being disposed in a rectangular matrix, said first conductors comprising a plurality of conductors each common to cells in a plurality of rows of said matrix, and said second conductors comprising a plurality of conductors each common to cells in a plurality of columns of said matrix,

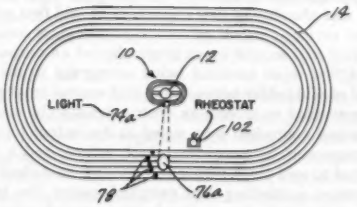
said switching means comprising a plurality of bilateral threshold switches each connected between said source of signals and a respective one of said conductors common to cells in a plurality columns of said matrix, said switching means further comprising means for sequentially connecting each of said conductors common to a plurality of rows of said matrix to said source of signals.

4,028,693

PACE SETTING LIGHT FOR JOGGERS

Ronald W. Kuntz, 4049 56th St., Des Moines, Iowa 50312

Filed Aug. 27, 1975, Ser. No. 608,073
Int. Cl.² G08B *23/00;* **A63K** *1/00*
U.S. Cl. 340—323 R **3 Claims**



1. A device for projecting a moving spot of light onto a jogging track comprising,

a frame corresponding to the shape of said jogging track,

power means mounted to said frame, said power means having a power take-off shaft,

a power gear mounted on said power take-off shaft of said power means,

a first continuous flexible toothed belt meshed with said power gear for constant velocity driven movement thereby,

a driving gear meshed with said power gear,

a second continuous flexible tooth belt meshed with said driven gear for constant velocity movement therewith,

said first and second flexible toothed belts being in parallel spaced apart relationship above said frame, and corresponding to the shape of said frame,

means extending upwardly from said frame to support said first and second flexible toothed belts in said parallel spaced apart relationship,

a light beam source in secured relationship to said first and second toothed belts for constant velocity movement with said belts when said belts are driven, said light beam source being electrically connected to a source of electrical energy.

4,028,694

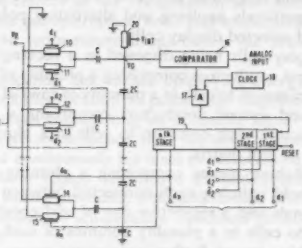
A/D AND D/A CONVERTER USING C-2C LADDER NETWORK

Peter William Cook, Mount Kisco, and Stanley E. Schuster, Granite Springs, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 10, 1975, Ser. No. 585,629

Int. Cl.² H03K *13/02*

U.S. Cl. 340—347 AD **8 Claims**



1. An analog-to-digital converter comprising a digital-to-analog converter of the type employing a C-2C switched capacitor ladder network having a plurality of first capacitors having equal first capacitance values, a plurality of second capacitors having equal second capacitance values twice said first capacitance values, said plurality of second capacitors being connected in series between an output terminal of said ladder network and a first reference potential, each of said plurality of first capacitors being connected to respective junctions between each of said plurality of second capacitors, and a plurality of switch means operable to connect respective ones of said plurality of first capacitors to said first reference potential or to a second reference potential, a comparator having first and second input terminals and an output terminal, said first input terminal being connected to the output terminal of said ladder network and said second input terminal being connected to receive an analog signal to be converted, clock means controlled by a signal at the output terminal of said comparator for providing clock pulses, and a counter connected to said clock means for counting said clock pulses, said counter controlling said switched means, the improvement in said switched capacitor ladder network wherein said plurality of first capacitors and said plurality of second capacitors are formed as a monolithic, multi-layer integrated circuit comprising:

a substrate having a plurality of diffused regions formed in one face thereof equal in number to the number of said plurality of first capacitors,

an insulating layer formed over said one face of said substrate and having disposed therein a plurality of conductive layers superposed to said plurality of diffused regions, said conductive layers being separated from said diffused regions by said insulating layer, and

a plurality of metalized regions deposited on said insulating layer and superposed to said plurality of conductive layers, said metalized regions being separated from said conductive layers by said insulating layer,

said plurality of diffused regions, said plurality of conductive layers, and said plurality of metalized regions having graduated areas such that each metalized region lies completely within the area of the corresponding conductive layer and each conductive layer lies completely within the area of the corresponding diffused region, the capacitors formed by said plurality of diffused regions and said conductive layers being said plurality of first capacitors and the capacitors formed by said plurality of conductive layers and said metalized regions being said plurality of second capacitors.

4,028,695

DATA TERMINALS HAVING INTERACTIVE KEYBOARDS AND DISPLAYS AND DATA PROCESSING APPARATUS INCORPORATING SUCH TERMINALS

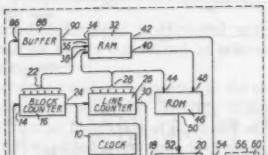
William George Saich, Camberley, England, assignor to The Solartron Electronic Group Limited, Farnborough, England

Filed July 11, 1974, Ser. No. 487,687

Claims priority, application United Kingdom, July 14, 1973, 33643/73

Int. Cl.² G06F *3/14*

U.S. Cl. 340—365 R **20 Claims**



1. A manually-operable data terminal for enabling an operator to communicate with a data processor, the terminal comprising:

a keyboard having a plurality of manually-selectable keys each key including means responsive to such selection to produce a signal representative of a respective message or part of a message to be communicated to the processor;

variable format display means separate from the keyboard having a plurality of zones each corresponding to a respective key of the keyboard, the display means being arranged to display in each zone an indication of the message or part of a message represented by the key corresponding to that zone;

control means responsive to said selection responsive means to change the visual appearance of the display produced by the display means so as to indicate which key is selected; and

means selectably operable by the operator when a desired key has been selected to produce an output signal for

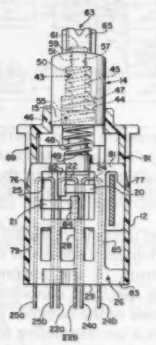
communicating the message or part of a message represented by the selected key to the processor.

4,028,696

DOUBLE DEPRESSION MAGNETIC KEYSWITCH

Robert Christen Madland, Mount Prospect; Robert Michael Zielinski, Jr., Schaumberg, and Keith Allen Engstrom, Arlington Heights, all of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.

Filed Jan. 26, 1976, Ser. No. 652,450
Int. Cl.² G08C 1/00
U.S. Cl. 340—365 L **12 Claims**



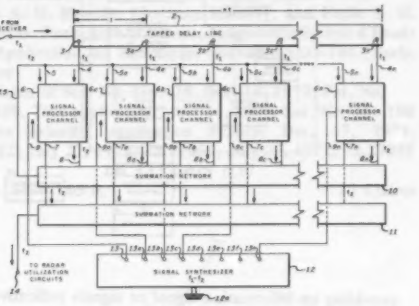
1. A keyboard switch comprising a housing, a depressible actuating member and at least one permanent magnet coupled to said actuating member so as to change the position of said magnet from an unactuated first position to an actuated second position representing a first condition when said actuating member is depressed, and to an actuated third position representing a second condition when said actuating member is further depressed, a unitary support assembly which is removable from said housing comprising first and second toroidal-shaped saturable magnetic cores with said first magnetic core being positioned above second magnetic core, at least one drive wire threaded through both of said cores, at least one sense wire threaded through each of said magnetic cores and a molded electrical insulating support element for supporting said magnetic cores and said drive and sense wires which are molded therein, said drive wires and said sense wires being configurated such that the terminating end of said drive and sense wires which extend out of said housing may be connected to a printed circuit board, a pin which is slideably positionable relative to said actuating member and having a head thereon, first and second spring means for biasing said actuating member to its unactuated position, said first spring means being positioned between said support element and said actuating member and said second spring means being positioned between said head of said pin and said actuating member, both of said magnetic cores being magnetically saturated when said permanent magnet is at its unactuated position, said first magnetic core being magnetically unsaturated and said second magnetic core being magnetically saturated when said permanent magnet is at its second position, at which said first bias spring is compressed and said second bias spring is relatively uncompressed, and said first magnetic core and said second magnetic core both being magnetically unsaturated when said permanent magnet is in its third position, at which both said first and second bias springs are compressed and said head of said pin is restrained against further downward motion by said support element.

4,028,697

ADAPTIVE SIGNAL PROCESSOR FOR CLUTTER ELIMINATION

Angelo P. Albanese, Brooklyn, and David H. Rattiner, Great Neck, both of N.Y., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Sept. 8, 1970, Ser. No. 70,194
Int. Cl.² G01S 9/42
U.S. Cl. 343—5 R **11 Claims**



8. Apparatus for improving the signal-to-interference characteristic of composite signals comprising desired pulse signals spaced at predetermined intervals, each in the presence of an extended interference signal, said apparatus comprising:

converter means, having plural output means, for placing one each of said desired pulse output means, for placing one each of said desired pulse signals simultaneously on said converter output means,

plural signal processor means each having first, second, and third input means and first and second output means,

means coupling said converter output means to said first input means of said processor means,

first coherent signal summation means having plural input means and output means,

means coupling said first output means of said signal processor means to said plural input means of said first signal summation means,

means coupling said output means of said first summation means to said second input means of said signal processor means,

second coherent signal summation means having plural input means and output means,

means coupling said second output means of said signal processor means to said plural input means of said second summation means, and

means for coupling said output means of said second summation means to utilization apparatus.

4,028,698

DME APPARATUS AND METHOD

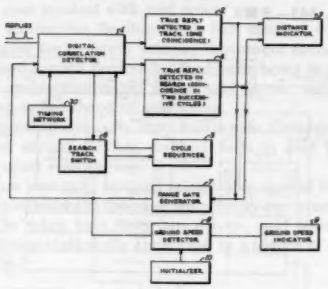
Wayne L. Miller, Stanhope, and Ernest J. Carnicelli, Flanders, both of N.J., assignors to The Cessna Aircraft Company, Wichita, Kans.

Filed Sept. 2, 1975, Ser. No. 609,647
Int. Cl.² G01S 9/56
U.S. Cl. 343—6.5 LC **26 Claims**

22. A method for determining the distance from a DME transmitter-receiver to a DME station, said transmitter transmitting a jittered interrogation pulse train and said receiver receiving signals from said station which after decoding consist of replies to said transmitted pulses, replies to pulses transmitted by other DME transmitters and squitter, a cycle being the time interval beginning with each interrogation pulse and ending a predetermined duration later during which duration received signals are processed by the apparatus, comprising the steps of

storing information indicative of the times of receipt of all signals received during a first cycle,

determining whether any of said stored times of receipt are identical to the times of receipt of signals received during the cycles following said first cycle for a predetermined number of successive cycles beginning with the second cycle,



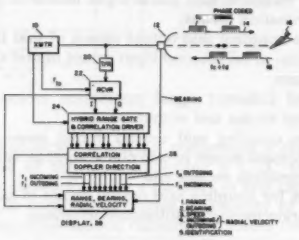
providing an information signal or signals indicative of all such times of receipt which are common for said predetermined number of successive cycles, and

deriving a distance measurement signal from the signal indicative of the first occurring of said common times of receipt.

4,028,699
SEARCH RADAR

Robert R. Stevens, Chelmsford, Mass., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Dec. 13, 1974, Ser. No. 532,344
Int. Cl.² G01S 9/233, 9/44
U.S. Cl. 343—9 **27 Claims**



1. A pulse doppler radar having fine range resolution capability comprising:

means for projecting a pulse of energy including phase coded packets towards a target, the position of each phase coded packet within the pulse correlating to a predetermined range within said pulse,

means for detecting energy returned from said target including phase coded packets reflected by said target and for generating quadrature signals responsive thereto,

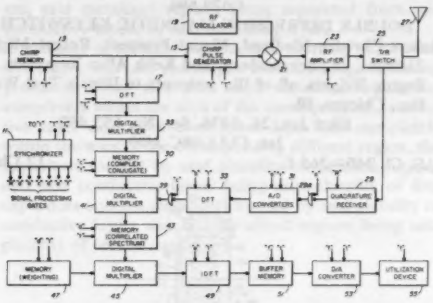
means for correlating said quadrature signals with a predetermined range code and a predetermined correlation waveform and for producing output signals responsive to the decoding of both said predetermined code, and said predetermined waveform, and

means responsive to said output signal for producing an indication of the existence of the target at the range corresponding to the number of phase coded packets within a pulse which are decoded by said predetermined range code and the radial velocity of said target.

4,028,700
PULSE COMPRESSION RADAR AND METHOD OF OPERATING SUCH A RADAR

David R. Carey, Sudbury; Bertram J. Goldstone, Lexington, and Bernard J. Thompson, Concord, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Nov. 16, 1972, Ser. No. 307,287
Int. Cl.² G01S 7/28
U.S. Cl. 343—17.2 PC **2 Claims**



1. In a pulse compression radar wherein an uncompressed transmitted chirp pulse and a selected uncompressed received chirp pulse are digitally processed in the frequency domain, the method of correlating such chirp pulses comprising the steps of:

a. deriving a first set of complex digital numbers representative of a first frequency spectrum corresponding to the frequency spectrum of the uncompressed transmitted chirp pulse, such spectrum containing amplitude ripples;

b. weighting each one of the complex digital numbers in the first set to derive a corresponding second set of complex digital numbers representative of the complex conjugate of the first spectrum modified to contain amplitude ripples equal and opposite to the amplitude ripples in the first spectrum;

c. storing the second set of complex digital numbers;

d. deriving a third set of complex digital numbers representative of the frequency spectrum of the selected uncompressed received chirp pulse; and,

e. multiplying the second and third set of complex digital numbers to derive a fourth set of complex digital numbers representative of a uniformly weighted frequency spectrum corresponding to a compressed received chirp pulse with range sidelobes.

4,028,701
QUASI-CORNER REFLECTORS FOR ELECTROMAGNETIC RADIATION

Jill J. Parks, P.O. Box 325, and Stephen R. Snook, P.O. Box 846, both of Port Hueneme, Calif. 93041

Filed Apr. 5, 1976, Ser. No. 673,568
Int. Cl.² H01Q 15/20
U.S. Cl. 343—18 C **10 Claims**

1. A plural polyhedrical reflective device for electromagnetic radiation, comprising:

a. a plurality of four-sided pyramidal cavities having reflective surfaces;

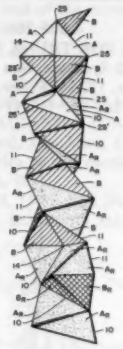
b. the base of each of said four sides being equal in length; the intersection of a plane normal to the vertical axis with the four sides of any one of said pyramidal cavities forming an equal sided parallelogram;

c. the vertex of each pyramidal cavity lying in a first common spiral path;

d. respective base corners of each pyramidal cavity lying in one of respective second and third common spiral paths;

e. said first, second and third spiral paths being symmetrical to each other about a common axis;

f. said plurality of pyramidal cavities being positioned adjacent each other in a side-by-side relationship forming a



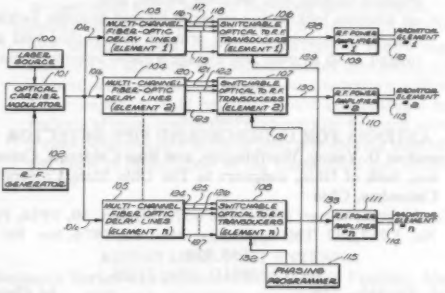
long spiral assembly of pyramidal electromagnetic energy reflectors.

4,028,702

FIBER OPTIC PHASED ARRAY ANTENNA SYSTEM FOR RF TRANSMISSION

Arnold M. Levine, Chatsworth, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed July 21, 1975, Ser. No. 597,417
Int. Cl.² H01Q 3/26
U.S. Cl. 343—100 SA **9 Claims**


LASER SOURCE
OPTICAL CARRIER MODULATOR
R. F. GENERATOR
MULTI-CHANNEL FIBER-OPTIC DELAY LINES (ELEMENT 1)
SWITCHABLE OPTICAL TO R.F. TRANSDUCERS (ELEMENT 1)
R.F. POWER AMPLIFIER #1
RADIATOR ELEMENT #1
MULTI-CHANNEL FIBER-OPTIC DELAY LINES (ELEMENT 2)
SWITCHABLE OPTICAL TO R.F. TRANSDUCERS (ELEMENT 2)
R.F. POWER AMPLIFIER #2
RADIATOR ELEMENT #2
MULTI-CHANNEL FIBER OPTIC DELAY LINES (ELEMENT n)
SWITCHABLE OPTICAL TO R.F. TRANSDUCERS (ELEMENT n)
R.F. POWER AMPLIFIER #n
RADIATOR ELEMENT #n
PHASING PROGRAMMER

1. In a radar system including a plural element antenna array at least some elements of which are individually phase-controlled for forming a relatively narrow beam directive in at least one plane, the combination associated with at least one of said phase-controlled antenna elements comprising:

first means including a radio frequency generator for producing a signal at the RF frequency of operation of said system;

second means comprising a source providing a light energy output;

third means including a modulator connected for modulating said light energy source with the output of said radio frequency generator;

fourth means responsive to the modulated light output of said third means, including a plurality of optical delay lines driven in parallel from said third means, said optical delay lines each having a physical length for producing a discrete phase delay required to excite a corresponding one of said elements according to a predetermined phasing program;

fifth means operatively associated with said fourth means, for selecting a signal as an output, said selected signal passing through a predetermined one of said optical delay lines to provide a signal having said discrete phase delay; and

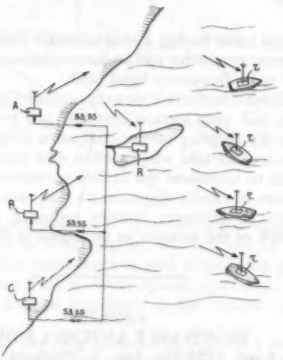
sixth means responsive to said fifth means for demodulating said light signals and for providing an RF output signal to said corresponding array element.

4,028,703

APPARATUS FOR RADIO POSITION-FIXING OF THE HYPERBOLIC PHASE-MEASUREMENT TYPE

Etienne A. H. Honore, Chatenay-Malabry, and Emile L. G. Torcheux, Paris, both of France, assignors to Societe d'Etude et d'Application des Techniques Nouvelles NEO-TEC, Paris, France

Division of Ser. No. 316,428, Dec. 18, 1972, Pat. No. 3,983,559. This application Mar. 24, 1975, Ser. No. 561,198
Claims priority, application France, Dec. 17, 1971, 71.45492; July 27, 1972, 72.27058; July 27, 1972, 72.27059
Int. Cl.² G01S 1/30
U.S. Cl. 343—105 R **13 Claims**



1. Apparatus for determining the position of a receiver by radio position-fixing comprising:

at least two transmitting stations, each being adapted to radiate

a continuous specific signal of first selected frequency, the frequency of said specific signal radiating from each of said transmitting stations being different from the frequency of said specific signal radiating from all other transmitting stations, and

a sequential signal of second selected frequency, the frequency of said sequential signal being the same at all of said at least two transmitting stations, at most one transmitting station radiating said sequential signal at any time, and

a receiver being adapted to continuously receive at least two of said specific signals and to receive said sequential signal, said receiver including means for decoding said specific signal and said sequential signal to obtain the position of the receiver.

4,028,704

BROADBAND FERRITE TRANSFORMER-FED WHIP ANTENNA

Judd Blass, Herzliah Petuach, Israel, assignor to Beam Systems Israel Ltd., Nof Yam, Israel

Filed Aug. 18, 1975, Ser. No. 605,338
Int. Cl.² H01Q 1/32
U.S. Cl. 343—715 **11 Claims**

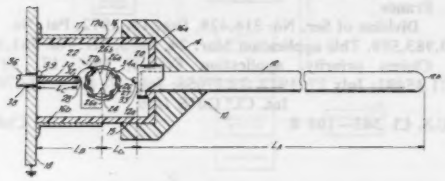
1. A broadband whip antenna having a generally constant impedance across a radio frequency band of greater than 2.5:1, comprising:

a conductive ground plane;

a whip section comprising an elongated cylindrical conduc-

tor of a length approximately equal to 0.185 wavelengths at a lowest frequency in said frequency band and having a length to diameter ratio of the order of 200 or more;

means for positioning said whip section in a plane generally transverse to said ground plane with a first end of said whip section nearest to said ground plane being spaced a predetermined fraction of a wavelength from said ground plane at said lowest frequency to enhance the directivity characteristic of the antenna, said positioning means having a length sufficient to position a second end of said whip section approximately 0.21 wavelengths from said ground plane at said lower frequency;



a coaxial cable having a characteristic impedance between an inner conductor and an outer conductor thereof across said radio frequency band; and

broadband transformer means positioned immediately adjacent said whip section first end and having a magnetic core for coupling said coaxial cable inner and outer conductors and said whip section end nearest said ground plane to transform the radiation resistance of said whip section to closely approximate said coaxial cable characteristic impedance, thereby reducing variation of the VSWR of the antenna as measured at the coaxial cable.

4,028,705

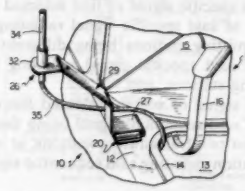
REMOVABLE ANTENNA MOUNT

J. Leslie Loyd, 1524 Elm Ave., S. Pittsburg, Tenn. 37380

Filed Apr. 29, 1976, Ser. No. 681,861

Int. Cl.² H01Q 1/32

U.S. Cl. 343—715 **3 Claims**



1. An antenna mount for use with a vehicle having a closure member which can be selectively opened and closed, comprising a substantially flat base member, means for mounting said base member on the vehicle in a fixed position underlying a portion of the closure member, said base member having at least one passageway, a body member selectively connected to said base member, said body member having inner, intermediate and outer portions, said inner portion including at least one finger means of a size to be slidably received within the passageway of said base member, said intermediate portion of said body member being elongated and extending outwardly at an angle to said inner portion for positioning adjacent to the vehicle closure member so that the closure member locks said body member to said base member, and said outer portion of said body member having means for receiving a portion of an antenna, whereby said body member is selectively mounted on said base member in a position to support an antenna exteriorly of the vehicle or said body member may be selectively removed from said base member so that no portion of said antenna mount or the antenna is visible when the closure member is closed.

4,028,706

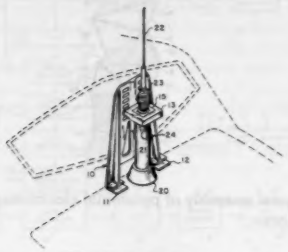
SECURITY LOCK FOR TRUNK MOUNTED ANTENNA

Alvin J. Dolle, 13322 Syracuse, San Antonio, Tex. 78249

Filed Apr. 19, 1976, Ser. No. 678,449

Int. Cl.² H01Q 1/32

U.S. Cl. 343—715 **6 Claims**



1. A lock and mounting brace for a trunk mounted automobile antenna comprising:

a. a main body having a top portion and a bottom portion,

b. a multiplicity of trunk lid clips constructed in the bottom portion of said main body,

c. an antenna locking arm securing means constructed in the top portion of said main body,

d. an antenna locking arm adapted to securely engage said antenna locking arm securing means, and

e. an antenna locking lug engaged by said antenna locking arm, said antenna locking arm so constructed and arranged as to fit over and engage a radio antenna means.

4,028,707

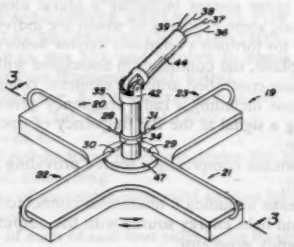
ANTENNA FOR UNDERGROUND PIPE DETECTOR

Jonathan D. Young, Worthington, and Ross Caldecott, Columbus, both of Ohio, assignors to The Ohio State University, Columbus, Ohio

Continuation-in-part of Ser. No. 437,927, Jan. 30, 1974, Pat. No. 3,967,282. This application Mar. 11, 1976, Ser. No. 665,924

Int. Cl.² H01Q 1/04, 21/26

U.S. Cl. 343—719 **14 Claims**



1. An antenna for transmitting and receiving broad spectrum electromagnetic radiation said antenna comprising a pair of oppositely extending non-resonant, distributively, resistively loaded transmitting arms and a pair of oppositely extending non-resonant, distributively, resistively loaded receiving arms arranged transversely to said transmitting arms, each of said arms comprising an outwardly extending generally

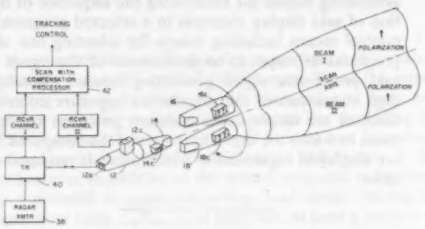
horizontal portion connected at its outer extremity to a return loop portion extending at a higher level than the horizontal portion toward a central common connection and a resistance connecting the interior end of the return loop portion to the said central common connection.

4,028,708

ANTENNA FEED FOR DUAL BEAM CONICAL SCAN TRACKING RADAR

Elmer Donald Woodward, Los Altos, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 10, 1975, Ser. No. 622,283
Int. Cl.² H01Q *3/10*
U.S. Cl. 343—777 **8 Claims**



1. An antenna feed for a dual beam conical scanning radar comprising:

input means for resolving an input signal into its vertical and horizontal polarization components;

first and second means for outputting first and second output signals that are identically polarized to each other and to said input signal and for receiving return signals;

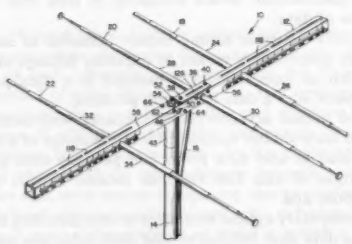
coupling means for coupling said input means to said first and second means and for separating a return signal received by said first and second means into a first component and a second component in quadrature with said first component, said coupling means comprising a non-reciprocal cross connection between said first and second means, whereby said antenna feed provides for control of the plane of polarization of the transmitted and received signals.

4,028,709

ADJUSTABLE YAGI ANTENNA

Benjamin Berkowitz, Baltimore, Md.; Arthur Luedtke, Marietta, Ga.; William L. Kilpatrick, Austell, Ga., and William F. Bentley, Jr., Smyrna, Ga., assignors to The United States of America as represented by the Field Operations Bureau of the Federal Communications Commission, Washington, D.C.

Filed Sept. 10, 1975, Ser. No. 611,938
Int. Cl.² H01Q *19/30*
U.S. Cl. 343—819 **2 Claims**



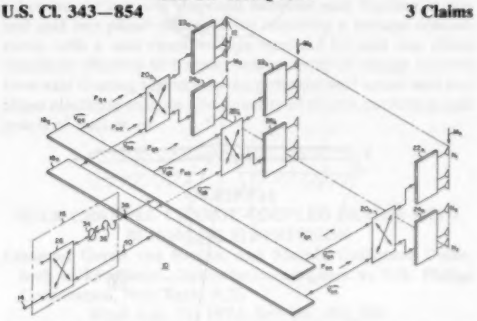
1. A yagi antenna comprising a rectangular antenna boom slotted on opposed faces with director and reflector elements coupled to slideable block within said boom through said slots, with half-wave active dipole element affixed to said boom with two insulated blocks on opposed faces and all said director, reflector, and active elements are adjustable in length and the said director and reflector elements are adjustable in spacing with respect to the active element.

4,028,710

APPARATUS FOR STEERING A RECTANGULAR ARRAY OF ELEMENTS BY AN ANGULAR INCREMENT IN ONE OF THE ORTHOGONAL ARRAY DIRECTIONS

Gary E. Evans, Glen Burnie, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 3, 1976, Ser. No. 663,340
Int. Cl.² H01Q *3/26*
U.S. Cl. 343—854 **3 Claims**



1. In a directional antenna array of the type having radiating elements aligned in a rectangular arrangement of rows and columns, the directional beam of said array being selectively steerable between limit positions spaced apart by at least one predetermined angular increment in the column plane, the combination:

a. a plurality of radiating elements arranged in a rectangular array in which the elements are aligned in a set of rows and a set of columns, each column of the set of columns comprising first, second and third subsets of radiating elements, said first and second subsets of each column having like numbers of radiating elements and being disposed with bilateral symmetry to one and the other side of the midpoint of the column, said third set of radiating elements being centrally disposed between the first and second subsets and being centered relative to the midpoint of the column,

b. an array input terminal for receiving r.f. energy,

c. first column-plane beam steering means operative to feed a reference unphased voltage component of said r.f. energy to said third subset of radiating elements and operative to derive from said r.f. energy a selected one of first and second invertible relationships of a doublet of first and second conjugal phase shifted voltage components, and to apply said first and second conjugal voltage components to said first and second subsets, respectively.

4,028,711

METHOD OF AND DEVICE FOR ELECTROSTATIC PRINTING

Gerhard Jost; Ulf Rothgordt, both of Norderstedt, and Klaus Witter, Hamburg, all of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

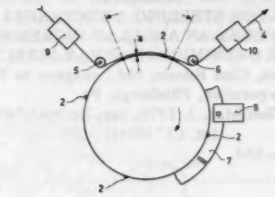
Filed Apr. 2, 1975, Ser. No. 564,305
Claims priority, application Germany, Apr. 18, 1974, 2418632
Int. Cl.² G03G *13/044, 13/052*
U.S. Cl. 346—153 **10 Claims**

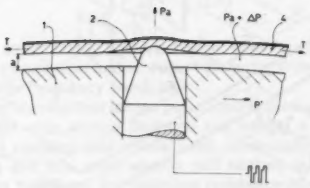
1. A method for electrostatically printing characters which comprises:

providing a record carrier;

providing an electrode which is constructed as a needle having an area of contact dimensioned for forming a predetermined track width on the record carrier;

sliding the electrode against the record carrier under a pressure sufficient to deflect the surface of said record carrier, said sliding step providing no support for the record carrier on the side remote from said electrode and in the immediate region of each of said electrodes;





applying selectively controllable pulses during sliding movement between said electrode and said record carrier;

whereby the area of contact between said record carrier and said electrode determines the width of a recorded track and the charge density applied to said record carrier is linearly dependent on the voltage applied to said electrode.

4,028,712

DISPLAY SYSTEM FOR PHOTOGRAPHIC CAMERA

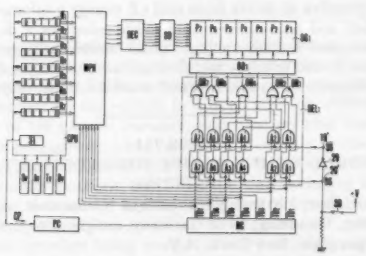
Masaharu Kawamura, Hino; Nobuaki Sakurada, Yokohama; Nobuhiko Shinoda, Tokyo; Tadashi Ito, Yokohama; Fumio Ito, Yokohama, and Hiroyashu Murakami, Tokyo, all of Japan, assignors to Kanon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 26, 1975, Ser. No. 635,370

Claims priority, application Japan, Nov. 27, 1974, 49-136843; Nov. 27, 1974, 49-136844

Int. Cl.² G03B *17/20*

U.S. Cl. 354—23 D **3 Claims**



1. A display system adapted for use in conjunction with an automatic exposure control system of a camera of the type having a shutter preselection and a diaphragm preselection automatic exposure control modes comprising;

a. a first group of registers for storing the preselected exposure control parameter in binary coded decimal form,

b. a second group of registers for storing the computed result in binary coded decimal form,

c. timing pulse generating means,

d. a multiplexer connected to said first and said second groups of registers and receptive of the timing pulses from said timing pulse generating means for causing the data stored in said first and second groups of registers to be read out in sequence,

e. a decoder for converting the outputs of said multiplexer to corresponding coded signals for display,

f. digital readout means comprises of an array of display elements for displaying digit characters corresonding to the outputs of said decoder,

g. preference signal generating means having shutter preference signal generating means and diaphragm preference signal generating means, and

h. display control means cooperative with said timing pulse generating means for controlling the sequence of operation of said display elements in a selected program; said control means including means for selecting one of two programs in response to occurrence of the signal from said preference signal generating means, whereby the digit characters of the preselected exposure control parameter are displayed in constant positions relative to those in which the digit characters of the computed result are displayed regardless of which mode is rendered operative.

4,028,713

DATA RECORDING CAMERA

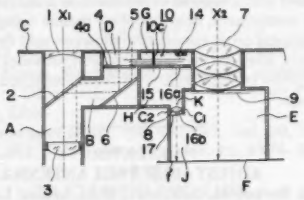
Saichiro Ohashi, Kyoto, and Susumu Fujita, Kobe, both of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed June 2, 1976, Ser. No. 692,073

Claims priority, application Japan, June 3, 1975, 50-67208; June 3, 1975, 50-67209

Int. Cl.² G03B *17/24*

U.S. Cl. 354—106 **5 Claims**



1. In a camera including an exposure system comprising a main focussing lens system and associated main shutter means actuable to effect exposure of film material at an exposure station to image-wise light reflected from a scene to be photographed and a viewfinder system to permit viewing of a scene to be photographed, the improvement comprising:

data specification means including at least one identical item of data;

externally actuable setting means actuable to move said data specification means to different settings in each of which an item of data is brought to a data projection position and a data reflection position;

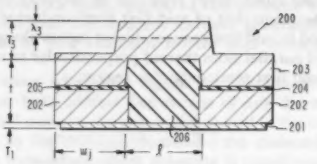
optical means actuable simultaneously with actuation of said main shutter means to focus the image of a data item located at said data projection position onto a specific portion of said film material located at said exposure station; and

supplementary optical means for always directing the image of a data item located at said data reflection position to said viewfinder system, whereby content of and position relative to said frame of said data item are viewable in said viewfinder system.

4,028,714
ULTRALOW-POWER, MICRO-MINIATURIZED JOSEPHSON DEVICES HAVING HIGH INDUCTANCE

Walter H. Henkels, Putnam Valley, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1974, Ser. No. 537,802
Int. Cl.² H01L *39/22, 27/18*
U.S. Cl. 357—5 **22 Claims**



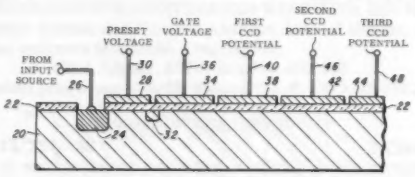
1. A superconductive device for operation at a constant temperature below the critical temperature, T_c, of the superconducting materials of said device comprising at least two Josephson tunneling junctions, and means for providing kinetic inductance interconnecting said at least two Josephson tunneling junctions wherein said kinetic inductance is the self-inductance in addition to the normal magnetic inductance when a material is superconducting, said device having an enhancement ratio, L_K/L_∞, of at least one, at least a portion of said means having a thickness less than the London penetration depth, λ, thereof at absolute zero temperature,

where L_K is the difference between the total inductance, L_T, which said device would have at a temperature of absolute zero, and the inductance L_∞ which said device would have at a temperature of absolute zero if the thickness of said at least a portion of said means and the remainder of said means were very large relative to said London penetration depth at absolute zero temperature.

4,028,715
USE OF FLOATING DIFFUSION FOR LOW-NOISE ELECTRICAL INPUTS IN CCD'S

Stephen P. Emmons, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 373,568, June 25, 1973, abandoned. This application Sept. 30, 1975, Ser. No. 618,086
Int. Cl.² H01L *29/78*
U.S. Cl. 357—24 **7 Claims**

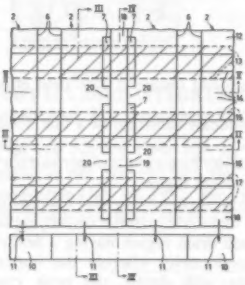


1. In a charged coupled device comprising a semiconductor substrate and phase electrodes overlying and insulated from a surface of said substrate, input structure for introducing, under control of input signals applied to said input structure, charge packets into a potential well in said substrate beneath at least one of said phase electrodes, and means for applying clock voltages to said phase electrodes for propagating said electrical charges along said substrate beneath said phase electrodes said input means comprising charge carrier source means defined adjacent said semiconductor substrate surface, said source means connected to an input terminal; a floating doped region having no directly overlying electrode thereby reducing the capacitance C of said floating doped region to less than that of said potential well beneath said one phase electrode and simultaneously reducing the kTC noise associated with said floating doped region wherein k = Boltsman's constant and T = absolute temperature, said floating doped region being of opposite conductivity type from that of said substrate, and disposed at said substrate surface between said charge carrier source means and said one phase electrode; first gating means overlying and insulated from said semiconductor substrate surface and disposed between said charge carrier source means and said floating region for receiving a voltage difference between said input terminal and said first gating means dependent on the amplitude of a signal to be inputted into the charge coupled device such that said floating region receives a quantity of charge carriers substantially free of kTC noise components from said charge carrier source means dependent on the amplitude of said input signal; second gating means overlying and insulated from said semiconductor substrate surface and disposed between said floating region and said one phase electrode for receiving a voltage concurrently with a said clock voltage received by said one phase electrode effective to transfer said quantity of charge carriers from said floating region into the potential well under said one phase electrode to store said quantity of charge carriers in said potential well.

4,028,716
BULK CHANNEL CHARGE-COUPLED DEVICE WITH BLOOMING SUPPRESSION

Johannes Gerrit van Santen, and Marnix Guillaume Collet, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 19, 1974, Ser. No. 498,594
Claims priority, application Netherlands, Aug. 23, 1973, 7311600
Int. Cl.² H01L *29/78, 27/14, 31/00;* **G11C** *19/28*
U.S. Cl. 357—24 **13 Claims**



1. A radiant energy sensor of the bulk-channel charge coupled type with blooming suppression, comprising a semiconductor body having an elongated semiconductor layer of first type conductivity and serving as a storage and transfer signal channel for first type majority signal carriers generated by incident radiant energy, means for electrically isolating the layer from its surroundings, means including electrodes arranged adjacent a surface of the body and the signal channel and capable when the electrodes are electrically biased of forming a depletion zone throughout the channel thickness and of forming in the channel a series of potential wells having, within the channel and separated in the transfer direction by potential barriers, potential minima where majority carriers can be stored and further capable of transferring the carriers from well to successive well along the channel interior, and means for draining excess majority carriers comprising a semiconductor drain zone of a first type conductivity arranged in the body alongside the signal channel and directly connected to the signal channel and when electrical bias is applied cooperating with the electrical isolation means to establish between

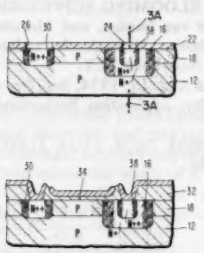
the drain zone and the storage wells an overflow potential barrier which maintains the electrical isolation of the signal channel but whose height at locations each adjacent a storage well is lower than that of the potential barrier between successive wells during storage thereby to preferentially attract excess majority carriers overflowing the storage wells, said isolating means comprising a semiconductor isolation zone of a second opposite-type conductivity which, viewed on the surface, extends in the semiconductor body parallel to and besides the signal channel and separates laterally the signal channel from the drain zone except for locallized channels of the first type conductivity which interconnect the signal channel and the drain zone, said channels having a thickness and a doping concentration at which a depletion zone can be established throughout its thickness by means of an electric field so as to obtain said overflow potential barrier.

4,028,717

FIELD EFFECT TRANSISTOR HAVING IMPROVED THRESHOLD STABILITY

Richard C. Joy; Ingrid E. Magdo, both of Hopewell Junction, and Alfred Phillips, Jr., Wappingers Falls, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Sept. 22, 1975, Ser. No. 615,251
Int. Cl.² H01L 29/78
U.S. Cl. 357—23 **7 Claims**



1. An improved insulated gate field effect transistor comprising

a semiconductor substrate of a first conductivity type having source and drain regions of a second opposite type conductivity formed in a major surface thereof and defining a channel region;

a gate electrode overlying said channel region,

a layer of dielectric material underlying said gate electrode,

at least said drain region having a first region of a second type conductivity wherein the impurity concentration increases with depth, the peak concentration being spaced inwardly from said major surface, said first region defining a side of said channel region, and a second region of said second type conductivity located and encompassed within said first region and having a peak impurity concentration at said major surface, and

a drain electrode in ohmic contact with said second region.

4,028,718

SEMICONDUCTOR HALL ELEMENT

Masatoshi Migitaka, Kokubunji, and Yozo Kanda, Hamamatsu, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 28, 1975, Ser. No. 626,454
Claims priority, application Japan, Dec. 25, 1974, 49-148052
Int. Cl.³ H01L 29/82
U.S. Cl. 357—27 **14 Claims**

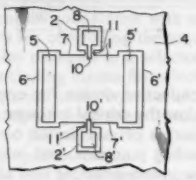
1. A semiconductor Hall element comprising:

a semiconductor substrate including a first semiconductor layer of a first conductivity type and having a first surface;

a first semiconductor region of a second conductivity type, opposite said first conductivity type and having a substantially rectangularly shaped surface area, disposed beneath and extending to said first surface of sadi substrate;

a second semiconductor region of said second conductivity type, having a prescribed shaped surface area less than that of said first semiconductor region disposed beneath and extending to said first surface of said substrate, adjacent to, but spaced apart from, a first side of said first semiconductor region;

third and fourth elongated semiconductor regions of said second conductivity type and an impurity concentration higher than that of said first semiconductor region, disposed in said first semiconductor region along second and third parallel sides thereof perpendicular to said first side of said first semiconductor region;



a fifth semiconductor region, of said second conductivity type and having an impurity concentration higher than that of said second semiconductor region, disposed in said second semiconductor region;

a sixth semiconductor region, of said second conductivity type, disposed beneath and extending to said first surface of said substrate and being contiguous with said first and second semiconductor regions; and

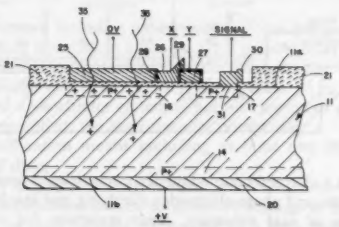
a seventh semiconductor region of said second conductivity type and having an impurity concentration higher than that of said first semiconductor region, disposed in said sixth semiconductor region so as to be contiguous with said fifth semiconductor region and overlapping said first side of said first semiconductor region.

4,028,719

ARRAY TYPE CHARGE EXTRACTION DEVICE FOR INFRA-RED DETECTION

Orlie L. Curtis, Culver City, Calif., assignor to Northrop Corporation, Los Angeles, Calif.

Filed Mar. 11, 1976, Ser. No. 666,165
Int. Cl.² H01L 27/14, 29/78
U.S. Cl. 357—30 **9 Claims**



1. An infra-red detector array comprising a plurality of detector elements, each of said elements comprising:

a substrate of an extrinsic semi-conductor material adapted to generate majority carriers in response to infra-red radiation, said substrate having front and back surfaces through either of which such radiation passes,

a plurality of majority carrier diffused regions separated from each other and formed along the front surface of the substrate,

a layer of dielectric material on said front surface,

a collector electrode deposited over said dielectric layer opposite one of said diffused regions, thereby forming a storage capacitor,

a conductive signal line deposited on said dielectric layer opposite and making electrical contact with another of said diffusion regions, and

conductive address line means deposited over said dielectric and positioned between said collector electrode and said signal electrode,

a biasing potential being applied to said collector electrode so as to attract the majority carriers generated in said substrate by said radiation toward said collector electrode,

whereby when addressing signals are simultaneously received at both address line means of any detector element, said majority-carrier charge stored in the capacitor formed by the collector electrode, the dielectric layer, and the top surface of the substrate is transferred to the signal line.

4,028,720

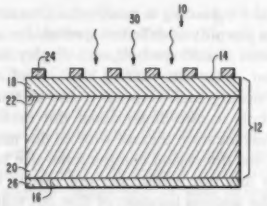
PHOTOVOLTAIC DEVICE

Jacques Isaac Pankove, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 24, 1976, Ser. No. 689,181

Int. Cl.² H01L *27/14*

U.S. Cl. 357—30 **10 Claims**



1. A semiconductor photovoltaic device comprising:

a body of silicon having therein gallium and arsenic paired molecular impurities in a concentration on the order of 10^{18} impurity pairs per cubic centimeter or greater, said body having an incident surface on which solar radiation is capable of impinging, and said body having means for forming a built-in electric field.

4,028,721

SEMICONDUCTOR CONTROLLED RECTIFIER DEVICE

Tsutomu Yatsuo, and Katsumi Akabane, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed July 22, 1974, Ser. No. 490,300

Claims priority, application Japan, Aug. 1, 1973, 48-85827; Aug. 31, 1973, 48-97171

Int. Cl.² H01L *29/74*

U.S. Cl. 357—38 **3 Claims**

1. A semiconductor controlled rectifying device comprising:

a semiconductor substrate including

a first layer of a first conductivity type,

a second layer having a second conductivity type, opposite said first conductivity type, and forming a first PN junction with said first layer adjacent thereto,

a third layer having said first conductivity type and forming a second PN junction with said second layer adjacent said third layer,

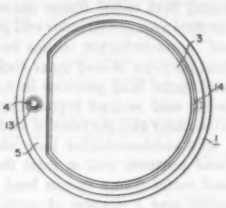
a fourth layer having said second conductivity type and forming a third PN junction with said third layer, said fourth layer being buried in said third layer with its surface exposed, and

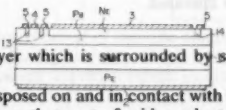
a fifth layer in ring form isolated from said fourth layer by said third layer and buried in said third layer with its surface exposed, said fifth layer forming a fourth PN junction with said third layer and having said second conductivity type, said fifth layer having a smaller area than said fourth layer;

a first main electrode in ohmic contact with at least the surface of said first layer;

a second main electrode in ohmic contact with at least the surface of said fourth layer;

a gate electrode in contact with that part of the surface of





said third layer which is surrounded by said fifth layer; and

a conductor disposed on and in contact with both said third and fifth layers, that part of said conductor disposed on said third layer extending along the periphery of said fourth layer spaced-apart from the periphery thereof by constant distance and a portion of said part of said conductor being in contact with said periphery of said fourth layer.

4,028,722

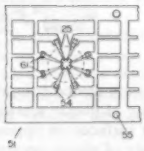
CONTACT BONDED PACKAGED INTEGRATED CIRCUIT

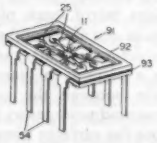
Robert W. Helda, Hollywood, Fla., assignor to Motorola, Inc., Chicago, Ill.

Division of Ser. No. 80,378, Oct. 13, 1970, Pat. No. 3,698,073, which is a continuation of Ser. No. 691,041, Dec. 15, 1967, abandoned. This application Oct. 10, 1972, Ser. No. 296,185

Int. Cl.² H01L *23/48, 29/44;* H02G *13/08*

U.S. Cl. 357—70 **2 Claims**





1. An encapsulated semiconductor device having metal lead portions inside and outside the encapsulation extending from a semiconductor unit, said metal lead portions being originally a part of two substantially flat metal frame means each said means provided in a generally strip-like configuration and each said means comprising a plurality of identical frame members spaced apart on each said metal frame means and

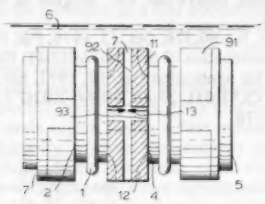
each frame member providing the metal lead portions for an ultimate semiconductor device, with the first of said metal frame means having lead portions each with an inner end portion and an outer end portion adapted to have semi-conductor means bonded to the lead portions thereof and being characterized by a flexibility which permits it to be wound on a spool for storage after semiconductor means are bonded thereto, and with the second of said metal frame means having frame members each of which is larger in area than a frame member of the first metal frame means and being stiffer and less flexible than said first metal frame means and not capable of being wound on a spool, said metal lead portions of said semiconductor device comprising the lead portions in a frame member from said first metal frame means extending outwardly from a central area at the inner end portions of the lead portions thereof, semiconductor means bonded to said first frame means lead portions at said inner end portions and said central area, said metal lead portions in said semiconductor device also having said second metal frame means bonded respectively to the outer end portions of said first frame means lead portions, said semiconductor unit and said first metal frame means lead portions and at least the bonded portion with said second metal frame means lead portions being in said encapsulation, and a portion of each of the latter lead portions extending out of said encapsulation for said device for connection with apparatus with which said semiconductor device is to be operated.

4,028,723

COOLING DEVICE FOR HEAT GENERATION MEMBER

Yoshiro Shikano, and Yasuhiro Ueoka, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 24, 1975, Ser. No. 552,145
Int. Cl.² H01L *23/02, 25/04, 23/12*
U.S. Cl. 357—82 **4 Claims**



1. A cooling device comprising:

a plurality of planar semiconductor elements having a pair of flat surfaces on opposite sides thereof;

a plurality of planar cooling members having a pair of flat surfaces on opposite sides therof, each planar cooling member positioned between and abutting the flat surfaces of a pair of said semiconductor elements, and each planar cooling member having a plurality of parallel, vertical first passageways therein between the circumference thereof and at least one second passageway therethrough between said two opposite flat surfaces transverse to and through at least one of said first passageways and opening against the surface of at least one of said semiconductors abutting said cooling member; and

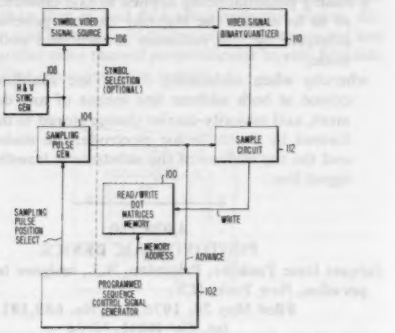
an electrically insulative refrigerant liquid completely surrounding said semiconductor elements and said cooling members and filling said first and second passageways in said cooling member, said refrigerant liquid having a boiling point less than the rated temperature of said semiconductor element.

4,028,724

READ/WRITE CHARACTER GENERATOR MEMORY LOADING METHOD

Ross Chipman Graham, Point Claire, Canada, assignor to RCA Corporation, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,651
Int. Cl.² H04N *5/66*
U.S. Cl. 358—160 **4 Claims**



1. A method for loading a read/write character generator memory with a plurality of different symbols for use in displaying selected ones of said symbols on a display device exhibiting a television raster scan during readout of said memory; said memory storing each respective one of said plurality of different symbols in two-dimensional dot matrix form at a separate address location thereof with all dot matrices having the same size first dimension and the same size second dimension, whereby any dot within any dot matrix is completely specified by the address location of that dot matrix, the ordinal line along the first dimension in which that dot is located and the ordinal position along that line in said second dimension in which that dot is located; said method comprising the steps of:

a. deriving a video signal at a predetermined horizontal sync rate and a predetermined vertical sync rate of a television frame of information including a single given one of said symbols located within a given window of said frame, which window corresponds with a dot matrix having first and second dimensions which are an integral multiple including unity of the first and second dimensions of said dot matrices of said memory, said window covering at least a preselected portion of said frame;

b. quantizing said video signal to produce an output manifesting a first binary value in response to said video signal being at at least a first given level and a second binary value in response to said video signal being below said first given level;

c. deriving at said predetermined horizontal sync rate and vertical sync rate a sampling pulse which occurs at a preselected position within said window of said frame and corresponds with a predetermined ordinal line and a predetermined ordinal position along that line of said window dot matrix;

d. sampling said quantized output with said sampling pulse to determine the binary value of said quantized output sample during the occurrence of said sampling pulse;

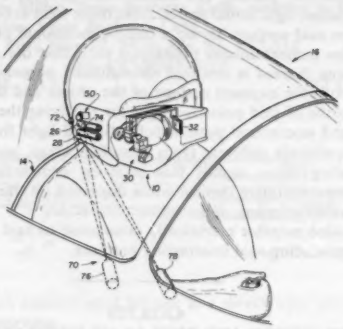
e. assigning a given address location in said memory to said given one of said symbols, and

f. storing the binary value of said sampled quantized output at the dot position located at said predetermined ordinal line and predetermined ordinal position along that line of the dot matrix of said memory having said assigned address location.

4,028,725
HIGH-RESOLUTION VISION SYSTEM

Edgar B. Lewis, Garden City, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Apr. 21, 1976, Ser. No. 679,035
Int. Cl.[2] H04N 7/18
U.S. Cl. 358—103 10 Claims



1. A high-resolution vision system for an observer having a field of view related to a predetermined reference axis comprising:

a helmet worn on the head of the observer;

apparatus on said helmet for mounting eye-tracking display means having an image presentation which is slaved to the eye line of sight of the observer;

a remote source of visual information including at least a first and a second pick-up sensor;

servo means for adjusting the orientation of said remote source with respect to said reference axis, the angular orientation thereof with respect to said axis being related to the angular orientation of said helmet and the eye angle of said observer;

communications means between said remote source and said helmet-mounted display means for transmitting visual information signals and control signals therebetween;

at least a first and a second light projecting means in said display means for producing light-information signals in response to visual information derived from said remote source;

means inserting said light signals from said first projecting means into a selected area of said light signals from said second light projecting means;

angularly adjustable optical means in said display means for superimposing the combined image of said light signals of the field of view of the observer by directing light carrying said signals into at least one eye of the observer with the area of the inserted image having a predetermined relationship with said line of sight;

monitoring means operatively associated with said helmet for measuring angular displacement thereof with respect to said reference axis and for producing control signals indicative of such angular displacement;

monitoring means operatively associated with said display means for measuring angular displacement of said optical superimposing means with respect to said eye line of sight and for producing control signals indicative of such angular displacement;

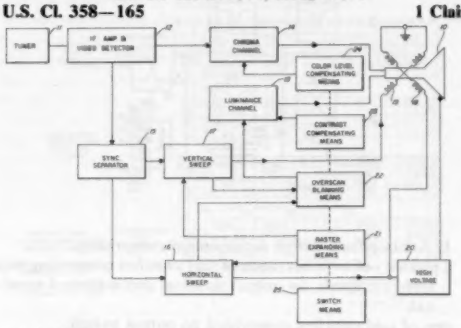
means responsive to said control signals from said eye line of sight monitoring means for adjusting the orientation of said optical superimposing means such that the orientation of said light information signals viewed by the observer remains substantially constant with respect to said eye line of sight; and

means responsive to the control signals from both said eye line of sight monitoring means and said helmet angle monitoring means for adjusting the angular orientation of said remote visual information source such that the angular orientation thereof remains substantially constant with respect to said line of sight.

4,028,726
TV RECEIVER RASTER EXPANSION SYSTEM

Thomas W. Argy, Chicago, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Jan. 27, 1975, Ser. No. 544,249
Int. Cl.[2] H04N 5/44; H01J 29/70
U.S. Cl. 358—165 1 Claim



1. In a television receiver of the type comprising a cathode ray picture tube having an image display screen and means responsive to received television signals including video signal components and horizontal vertical synchronizing components for scanning said screen with one or more electron beams in a rectangular coordinate pattern to produce an image raster having a predetermined aspect ratio, the improvement which comprises:

means for expanding said raster in both horizontal and vertical directions, such raster expansion resulting in overscan of said screen by said one or more electron beams during intervals corresponding to peripheral image portions;

overscan interval blanking means responsive to said horizontal synchronizing component and a vertical deflection component internally derived from said vertical synchronizing component, for developing a composite blanking signal to blank said one more electron beams during said overscan interval, said overscan interval blanking means being a common circuit, comprising:

an adjustable integrating network for reshaping said horizontal synchronizing component;

an adjustable amplitude control means for resizing said vertical deflection component;

diode gate circuitry coupled to said adjustable integrating network and said adjustable amplitude control means for partitioning the positive-going portions from the negative-going portions of said reshaped horizontal synchronizing component and said vertical deflection component;

modifying means coupled to said diode gate circuitry for processing said positive-going portions of said reshaped horizontal synchronizing component and said vertical deflection component;

pulse generating means coupled to said modifying means and said diode gate circuitry means for combining said negative-going portions and said processed positive-going portions of said reshaped horizontal synchronizing component and of said vertical deflection component and for combining said processed reshaped horizontal synchronizing component and said processed vertical deflection component; and

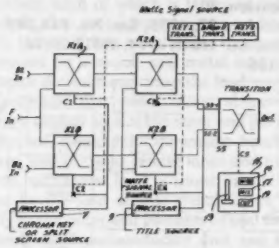
a buffer stage coupled to said pulse generating means for generating said composite blanking signal; and

switch means for concomitantly actuating said raster expanding means and overscan interval blanking means.

4,028,727
MIX/EFFECTS SWITCH ARRANGEMENT AND MIX/EFFECTS SWITCHING SYSTEM

Ole Skrydstrup, Pointe Claire, Canada, assignor to Central Dynamics Ltd., Canada

Filed May 7, 1976, Ser. No. 684,360
Int. Cl.² H04N 5/22
U.S. Cl. 358—181 11 Claims

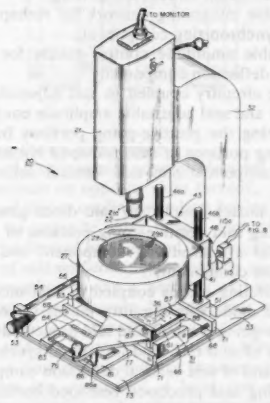


1. A mix/effects switch arrangement comprising:
a plurality of switches, each of said switches comprising two input terminals, an output terminal and a control terminal;
one of said switches comprising an output switch;
a first number of said plurality of switches being serially arranged to provide a first feedline to one input terminal of said output switch;
a second number of said plurality of switches being serially arranged to provide a second, parallel, feedline to the other input terminal of said output switch;
said output switch comprising a soft switch.

4,028,728
METHOD OF AND VIDEO SYSTEM FOR IDENTIFYING DIFFERENT LIGHT-REFLECTIVE SURFACE AREAS ON ARTICLES

Benny H. Sharp, Yukon, Okla., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Apr. 2, 1976, Ser. No. 672,914
Int. Cl.² H04N 7/18
U.S. Cl. 358—106 29 Claims

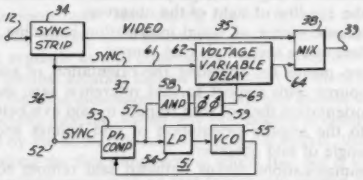


1. A video system for selectively ascertaining the presence and absence of, and for discriminating between, at least two distinctively different types of light-reflective surface areas formed on a common, exposed surface of a prepositioned object, one type of surface area being substantially two-dimensional, and the other type being substantially three-dimensional, said system comprising:
means for illuminating the exposed surface of said object with polarized light that extends across said surface such that in a direction at least substantially perpendicular thereto: (1) reflected light is minimized from those light-reflective areas on said surface having a substantially smooth, planar, two-dimensional profile, and (2) reflected light is maximized from those light-reflective areas on said surface having a three-dimensional profile;
video camera means positioned such that the axis of said lens thereof is oriented substantially perpendicularly to both the exposed surface of the object and the light ray paths of said polarized light for receiving the minimized and maximized patterns of reflected light from said respectively different types of surface areas, and for generating video signals that produce contrasting patterns representative thereof when displayed on the screen of a video monitor, and
a video monitor electrically connected to said camera for producing said contrasting patterns.

4,028,729
PROVISION AND DISPLAY OF VIDEO SIGNALS

Lewis B. Browder, Altadena, Calif., assignor to Bell & Howell Company, Chicago, Ill.

Filed Mar. 25, 1975, Ser. No. 561,958
Int. Cl.² H04N 5/04, 5/785
U.S. Cl. 358—148 39 Claims



23. In apparatus for enhancing flutter in an electrical signal affected by flutter, the improvement comprising in combination:
first phase lock loop means having input means for receiving said flutter-affected signal, first loop filter means, and output means;
second phase lock loop means having input means connected to said output means of the first phase lock loop means, second loop filter means, and output means;
means connected between said first and second said lock loop means for deriving an error signal from sid first phase lock loop means ahead of said first loop filter means and applying said derived error signal to said second phase lock loop means after said second loop filter means; and
means for deriving an output signal with enhanced flutter from said output means of the second phase lock loop means.

25. In a method of improving the display of video information contained in picture signals affected by flutter and synchronized by synchronizing signals subjected to processing by means for stabilizing synchronizing signals against at least part of said flutter, the improvement comprising the steps of:
compensating said stabilizing function to preserve flutter in said synchronizing signals; and
synchronizing said video signals for said display of vidoe information by synchronizing signals affected by essentially the same flutter as said picture signals;
said stabilization of synchronizing signals including attenuation of signals having flutter frequencies above a predetermined frequency; and
said compensation of said stabilizing function including the

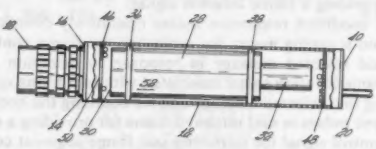
step of enhancing the flutter amplitude of said synchronizing signals having said flutter frequencies substantially inversely proportional to said attenuation.

4,028,730

VIDICON CAMERA FOR CLOSED CIRCUIT TELEVISION SYSTEM

Frederick A. Miller, Santa Barbara, Calif., assignor to Circon Corporation, Santa Barbara, Calif.

Filed May 17, 1976, Ser. No. 687,314
Int. Cl.² H04N 3/16
U.S. Cl. 358—217 **17 Claims**



1. A video camera head for use in a direct wire television system comprising

a video camera tube having an imaging surface for receiving an optical image thereon and for genertng a composite video signal representing a said optical image;

a metal housing having means defining an opening therethrough enabling a said optical image to impinge on said imaging surface, said housing enclosing and supporting said vidicon tube with the imaging surface thereof spaced in axial alignment a predetermined distance from the opening;

a first printed circuit board having an aperture extending axially therethrough of a dimension substantially equal to said opening, said first printed circuit board being positioned in said housing between said opening and said imaging surface with said aperture in axial alignment with said opening and said imaging surface, said first printed circuit board including

preamplifier means electrically connected to said vidicon tube for receiving said composite video signal and for producing an amplified additive composite video signal therefrom;

a second printed circuit board positioned between the end of the vidicon tube opposite to and in axial alignment with said imaging surface and said housing, said second printed circuit board including

amplifier means for amplifying in phase the composite video signal with a predetermined gain;

emitter follower amplifier means electrically connected to said amplifier means and adapted to drive a coaxial cable with said amplified composite video signal; and

conductor means electrically connected between said vidicon tube, said first printed circuit board, said second printed circuit board and a video processor.

4,028,731

APPARATUS FOR COMPRESSION CODING USING CROSS-ARRAY CORRELATION BETWEEN TWO-DIMENSIONAL MATRICES DERIVED FROM TWO-VALUED DIGITAL IMAGES

Ronald Barthold Arps, Stanford, Calif.; Lalit Rai Bahl, Amawalk, and Arnold Weinberger, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

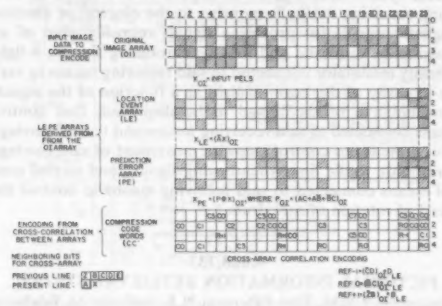
Filed Sept. 29, 1975, Ser. No. 617,906
Int. Cl.² H04N 7/12
U.S. Cl. 358—260 **11 Claims**

1. An apparatus for compression coding a $p \times q$ array of Boolean coded points applied to the apparatus in consecutive raster scan lines, said apparatus comprising:

means (**10, 12, 9**) for forming a high-order $p \times q$ prediction error array and an auxilliary $p \times q$ array of location events from the consecutive raster scan lines of the $p \times q$ array of Boolean coded points;

means (**8, 12, 61, 65, 63**) for counting runs C between consecutive pairs of errors in the prediction error array;

means (**14**) for forming a line difference codeword with difference value v upon the joint event of C>T where T is a threshold and either the single or multiple occurrence of location events in the ith-1 scan line of the location event array within the bit position range of $B \leqslant r \leqslant (j+n)$,



where positive integer B is the greater of function D(T,v) and ($j-n$), and the number of intervening location events, s, within the bit position range from search start position D(T,v) $\leqslant q<(j-n)$ not exceeding some limit m, where m, n, q, r and s are positive integers; and

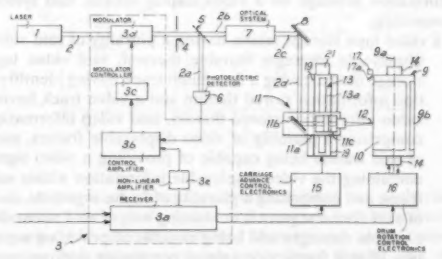
means (**14**) for forming a compression code word from the run-length count C between consecutive errors, in response to the occurrence of each error in the jth bit position of the ith scan line of the prediction error array upon either C $\leqslant$ T or C>T and there being no occurrence of a line difference encoding for the error, where i, j, C and T are positive integers.

4,028,732

APPARATUS AND METHOD FOR DISPLAY OF IMAGES

Lucien Salter, 9 Allee circulaire, and Gabriel Maincent, 24 Allee circulaire, both of 27200 Foret de Vernon, France

Continuation-in-part of Ser. No. 447,366, March 1, 1974, abandoned. This application Feb. 11, 1976, Ser. No. 657,281
Claims priority, application France, Mar. 2, 1973, 73.07567
Int. Cl.² H04N 1/06
U.S. Cl. 358—289 **19 Claims**



1. An apparatus for displaying an image tele-transmitted in the form of electric or electromagnetic signals, the image being formed by a plurality of parallel lines each comprising a plurality of points, the apparatus comprising a drum having a cylindrical surface; magnetic bearing means supporting said drum for rotation about its axis of revolution; a carriage; carriage driving means for driving said carriage in stepwise manner for translational movement parallel to said axis of said

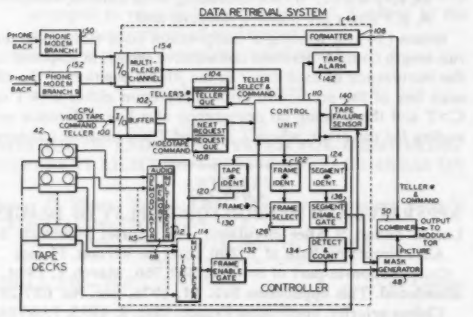
drum; friction means for damping out and rapidly stabilising the carriage position at the end of each movement step; a light source; beam directing means for directing a beam of light from said light source towards said cylindrical surface of said drum; an optical system disposed to lie in the path of the beam from said light source, said beam directing means including means for transmitting the beam along a path parallel to said axis in a direction towards said carriage, means carried on said carriage for intercepting the beam in said path and for deflecting it perpendicularly to said drum axis in a direction towards said drum and means for focusing an image formed in said optical system at the point of impact of the beam on said drum; receiving means responsive to the electric or electromagnetic signals for providing signals representative of an image to be displayed and first synchronizing signals; a light intensity modulator connected to said receiving means to vary the intensity of the beam of light as a function of the signals representative of the image to be displayed; first control means connected to said receiving means and to said carriage driving means to control stepwise movement of said carriage in response to the first synchronzing signals; and second control means connected to said receiving means to control the speed of rotation of said drum.

4,028,733

PICTORIAL INFORMATION RETRIEVAL SYSTEM

Edward M. Ulicki, East Paterson, N.J., assignor to Telebeam Corporation, Paramus, N.J.

Filed July 7, 1975, Ser. No. 593,680
Int. Cl.[2] H04N *5/785;* **G11B** *15/40*
U.S. Cl. 360—10 **35 Claims**



1. A system for retrievably providing a video display of an information message on a video display means, said system comprising:

a video tape storage media having a plurality of said video displayable messages storable thereon, said video tape storage media having a first audio track having identification information stored therein and a video track having video information stored therein, said video information comprising a plurality of video displayable frames, each of said frames being capable of providing a video signal containing the video displayable information within said frame and comprising a plurality of frame segments, each of said frame segments containing one of said video displayable messages and being capable of providing a portion of said frame video signal containing said one message, said first audio track identification information comprising a plurality of different unique frame identification codes, each frame code being uniquely associated with one frame of said plurality of frames, each of said frame video signals further comprising a plurality of horizontal sync pulses for the video display of said frame video signal, each of said sync pulses being associated with a displayable video scan line, each of said frame segment video signal portions of said frame video signal comprising a predetermined portion of the plurality of displayable video scan lines associated with said frame video display having a corresponding predetermined portion of said plurality of horizontal sync pulses;

means for selecting a unique video displayable message for video display thereof, said selection means providing a unique selection control signal uniquely corresponding to said selected message;

means for scanning said storage media in response to said selection control signal for initiating selection of said unique video displayable message, said scanning means comprising means for subsequently providing said video display from said storage media and means responsive to said first audio track frame identification information for providing a frame location signal;

first condition responsive means operatively connected to said scanning means for retrieving the frame containing said selected message in response to detection of the frame location signal associated with said frame containing said selected message and for counting the horizontal sync pulses in said retrieved frame for providing a display control signal for retrieving said frame segment containing said selected message in response to detection of the count associated with said selected message containing segment; and

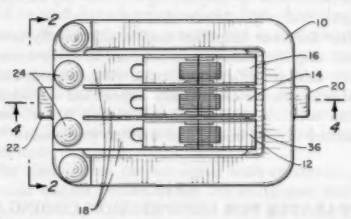
mask generator means operatively connected to said first condition responsive means for providing a composite video displayable output signal to said video display means, said mask generator means providing said single frame segment containing said selected message as said output signal in response to receipt of said display control signal and blanking said entire frame in the absence of receipt of said display control signal; whereby the audio track of a video tape storage media enables a single frame segment to be selectively retrieved from a plurality of frames of video information stored in the video track of said video tape storage media for video display of said frame segment.

4,028,734

PLURAL MAGNETIC HEAD ASSEMBLY WITH INDEPENDENTLY SUPPORTING STRUCTURE

Robert J. Mos, Huntington Beach, Calif., assignor to American Magnetics Corporation, Torrance, Calif.

Continuation of Ser. No. 578,449, May 19, 1975, abandoned. This application Sept. 22, 1976, Ser. No. 725,902
Int. Cl.[2] G11B *21/16, 5/48*
U.S. Cl. 360—104 **7 Claims**



1. Signal transducing magnetic head assembly means comprised:

a carrier frame,

mounting means on said frame for pivotally mounting said frame,

a plurality of magnetic heads disposed within said frame,

each said head being mounted to said frame by a plurality of parallel elongate leaf springs substantially forming a parallelepiped,

each spring having one end fixedly mounted to said frame and the opposite end fixedly mounted to its corresponding head,

whereby, by flexing of said springs, each said head may

translate individually, without rotating, on a line substantially normal to the plane of said frame.

4,028,735

HEAD INDEXING APPARATUS FOR A COMBINED TWO AND FOUR CHANNEL TAPE PLAYER/RECORDER

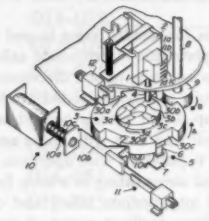
Toru Miyazaki, Iwaki, Japan, assignor to Alps Motorola, Inc., Tokyo, Japan

Filed Sept. 15, 1975, Ser. No. 613,712

Claims priority, application Japan, Sept. 17, 1974, 49-111888[U]

Int. Cl.² G11B *5/55, 21/08, 23/04*

U.S. Cl. 360—106 **9 Claims**



1. In a combined two and four channel tape player, a head indexing apparatus comprising:

a rotary body rotatably into a first number of fixed rotary positions and having a plurality of different cam surfaces;

magnetic head means for monitoring a magnetic tape, said head means coupled to said rotary body and having its position determined by the rotary position of said rotary body;

rotation means coupled to said rotary body for sequentially indexing said body into each of said first number of fixed rotary positions in response to the receipt of an actuation signal;

actuation means coupled to said rotation means for providing an initial actuation signal when a change in the position of the magnetic head means is desired; and

selection means coupled to said rotation means for selectively designating several of said first number of rotary positions as desired positions and controlling, by selectively creating additional actuation signals, the rotation of said rotary body by said rotation means so that said rotary body is sequentially rotated into each of said desired positions in response to the providing of said initial actuation signal by said actuation means, said selection means including a portion of a rotary switch rotated in association with said rotary body and an additional switch electrically connected in series with said rotary switch and being actuated during the rotation of said rotary body into each of said first number of positions, said rotary switch and said additional switch creating said additional actuation signals.

4,028,736

MOTOR PROTECTION CIRCUIT UNIT

James R. Willson, Trumbull, Conn., and Hugh J. Tyler, Santa Ana, Calif., assignors to RobertShaw Controls Company, Richmond, Va.

Filed Dec. 19, 1975, Ser. No. 642,219

Int. Cl.² H02H *7/08*

U.S. Cl. 361—29 **13 Claims**

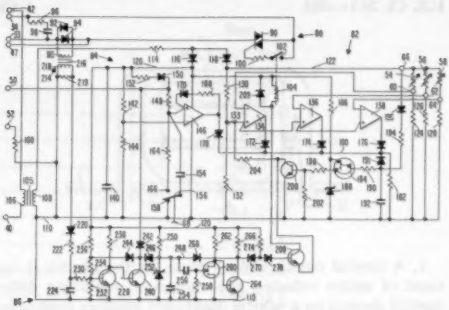
1. A protection circuit unit for connection in a motor system including a contactor having a contactor winding and contacts operated when the contactor winding is energized to connect the motor to an electrical source, the circuit unit comprising

a pair of terminals adapted to be connected in series with the contactor winding across an AC source,

a contactor energization circuit connected between the pair of terminals,

said contactor energization circuit including switch means for controlling the energization of the contactor winding,

said contactor energization circuit further including current sensing means connected in series with the switch means in the contactor energization circuit for producing a



signal only during current flow through the contactor winding,

said current sensing means being independent of which terminal of the pair of terminals the contactor winding is connected with, and

delay after break means responsive to termination of the signal from the current sensing means for preventing operation of the switch means for a predetermined duration after the termination of the signal from the current sensing means.

4,028,737

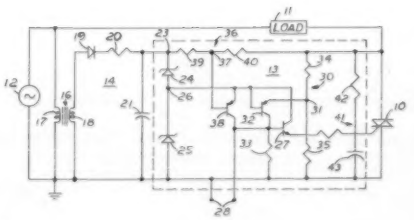
TRANSIENT VOLTAGE PROTECTION CIRCUIT

Ronald L. Bailey, Rockford, Ill., assignor to Barber-Colman Company, Rockford, Ill.

Filed Apr. 2, 1975, Ser. No. 564,540

Int. Cl.² H02H *3/20*

U.S. Cl. 361—86 **9 Claims**



1. A transient voltage protection circuit for a thyristor connected through the power and common terminals thereof in series with a load controlled thereby and an AC power supply, said circuit comprising a voltage divider and said thyristor through the power and common terminals thereof in parallel circuits, a tap on the voltage divider providing a control voltage as a function of the instantaneous voltage on said AC supply, a source of regulated DC reference voltage at a magnitude below the control voltage corresponding to a thyristor destructive voltage on said AC supply, a source of turn-on voltage, and means for selectively coupling said thyristor through a gate and the common terminal thereof across the source of turn-on voltage in response to said control voltage exceeding the reference voltage.

4,028,738

CENTRAL CIRCUIT CONTROL PLATES FOR AUTOMOTIVE VEHICLES

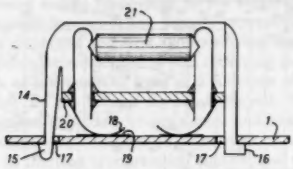
Philippe Rouvre, and Daniel Jean Augello, both of Billancourt, France, assignors to Regie Nationale des Usines Renault and Automobiles Peugeot, both of, France

Filed Apr. 30, 1973, Ser. No. 355,424

Claims priority, application France, May 10, 1972, 72.16824

Int. Cl.[2] H05K 5/00

U.S. Cl. 361—403 1 Claim



1. A central circuit control plate for the electrical equipment of motor vehicles, the equipment including different control devices on a vehicle dashboard emitting control information, safety devices and load circuits or receivers receiving said information, and a source of current to which said receivers are connected by means of said control devices, wherein said control plate comprises:

a single compact central unit including a predetermined circuit unit for distributing the control information to different load circuits or receivers which are all spaced apart from said control plate, means for transmitting said information, and intermediate safety and control members, connected between said predetermined circuit unit and said means for transmitting, for sending control information from said different control devices to said different load circuits or receivers of the vehicle;

a detachable printed circuit assembly plate having a plurality of controlled circuits, an input connector on the assembly plate connecting the controlled circuits to said source of current and to said means for transmitting, and an output connector connecting said printed circuit assembly plate to the different load circuits or receivers, intermediate safety and control members including fuses, circuit breakers, relays, and a flasher unit for direction indicators;

snap-action means for rapidly fixing to and removing from said assembly plate said intermediate safety and control devices when connecting to and disconnecting from said controlled circuits said safety and control devices; and

wherein said snap-action means comprises resilient legs provided at their free ends with claws and wherein said assembly plate is provided with apertures corresponding to said legs, said claws fitting in a snap fashion into said apertures, said intermediate safety and control devices further comprising resilient metal shoes connected to terminals of said intermediate safety or control devices and engaging corresponding strips of said controlled circuits, said snap-action means being integral with a box for an intermediate safety and control device.

DESIGN PATENTS

GRANTED JUNE 7, 1977

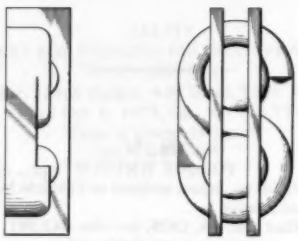
ERRATA

For CLASS	See PATENT NO.
008–367	244,585
013–028	244,610
013–028	244,611
013–024	244,612
014–045	244,613
014–043	244,614
014–068	244,615
014–096	244,616
014–053	244,617
013–005	244,618
027–036	244,619
024–017	244,637
028–051	244,640

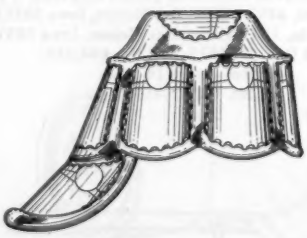
DESIGNS

JUNE 7, 1977

244,566
CANDY
John Clinton Evans, Jr., P.O. Box 138, North Olmsted, Ohio 44070, and Harold Eugene Kautz, 5923 Clearview Drive, Parma Heights, Ohio 44130
Filed July 18, 1975, Ser. No. 597,146
Term of patent 14 years
Int. Cl. D1—*01*
U.S. Cl. D1—15



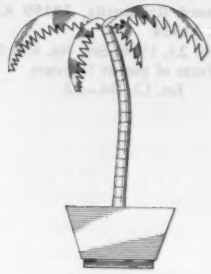
244,567
DISPLAY HAT
Wilhelmina Bocskay, Lake Worth, Fla., assignor to Gregory Ralph Albanese, Eastchester and John Cornelius Bocskay, Yorktown Heights, both of, N.Y.
Filed Apr. 23, 1975, Ser. No. 570,582
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—244



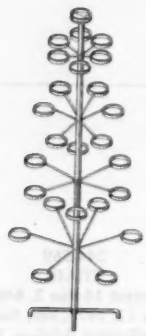
244,568
HAIR BRUSH
Morris G. Lepisto, 3708 Barham Blvd., Los Angeles, Calif. 90028, and Leonard Rabinovitz, 10459 Key West Ave., Northridge, Calif. 91324
Filed Feb. 23, 1976, Ser. No. 660,053
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—35

244,569
CHAIR
Eric Laroye, Koningstraat 14-Bus 2, 8400 Oostende, Belgium
Filed June 12, 1975, Ser. No. 586,485
Claims priority, application Belgium, Dec. 20, 1974, 60081
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—67

244,570
COMBINED MERCHANDISE DISPLAY COUNTER AND CEILING AIR CIRCULATOR
Don A. Taylor, 216 Mills St., Wadsworth, Ohio 44281
Filed Mar. 3, 1975, Ser. No. 554,587
Term of patent 14 years
Int. Cl. D20—*02;* D23—*03*
U.S. Cl. D6—153



244,571
STAND FOR POTTED PLANTS
Walter L. Cowan, Jr., 2305 W. Orlando Road, Panama City, Fla. 32405
Filed Nov. 28, 1975, Ser. No. 636,220
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—183



244,572
END SUPPORT FOR A TABLE AND BENCH COMBINATION
Paul F. John, Rte. 3, Box 206F, San Antonio, Tex. 78218
Filed Mar. 1, 1976, Ser. No. 662,716
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—192

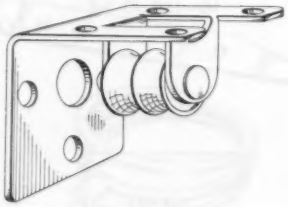
244,573
BOWL OR SIMILAR ARTICLE
James Lloyd Thrush, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio
Filed Sept. 4, 1975, Ser. No. 610,092
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—5

244,574
TORQUE WRENCH
Hiroshi Tsuji, Tokyo, Japan, assignor to Tohnichi Manufacturing Co., Ltd., Japan
Filed Dec. 19, 1975, Ser. No. 642,391
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—24

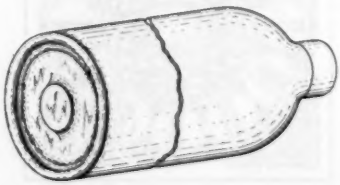
244,575
TOOL FOR OPENING PLASTIC LIDS
Wayne C. Endres, 4495 NW. 1, Des Moines, Iowa 50313, and Robert M. Cain, 1533 Maine, Des Moines, Iowa 50314
Filed Dec. 29, 1975, Ser. No. 644,555
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D8—40

244,576
HANDLE FOR A TIRE CUTTING TOOL
Guy A. Van Alstine, Merrybrook Road, R.D. 1, Collegeville, Pa. 19426
Filed Feb. 19, 1976, Ser. No. 659,567
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—107

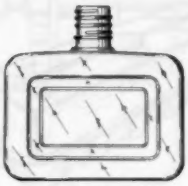
244,577
BRACKET FOR HANGING DECORATIVE WOVEN WOOD SHADES
Pero Glumac, 15566 Stetson, Los Gatos, Calif. 95030
Filed Oct. 6, 1975, Ser. No. 619,771
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—363



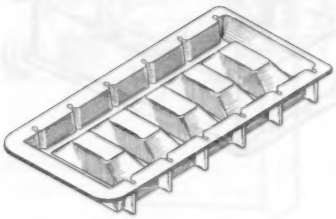
244,578
PRESSURE VESSEL FOR FIRE EXTINGUISHERS OR THE LIKE
Richard A. Avant, 105 Woodbine Ave., Rochester, N.Y. 14619
Filed May 10, 1974, Ser. No. 468,961
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—158



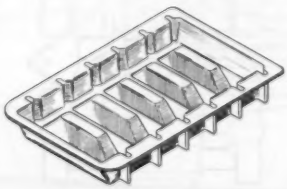
244,579
PERFUME BOTTLE
Pierre Francois Dinand, Levallois, France, assignor to Balenciaga S.A.
Filed Jan. 29, 1976, Ser. No. 653,471
Claims priority, application France, Oct. 23, 1974, 74.38619
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—167



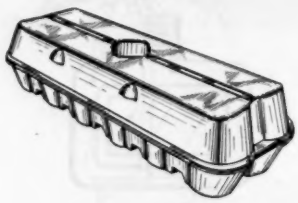
244,580
DISPLAY TRAY
David G. Keough, Greenburg, N.Y., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind.
Filed Dec. 12, 1975, Ser. No. 640,117
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—189



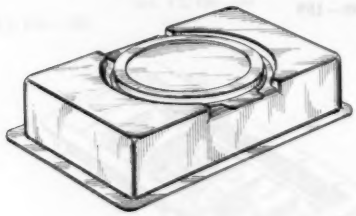
244,581
DISPLAY TRAY
David G. Keough, Greenburg, N.Y., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind.
Filed Dec. 15, 1975, Ser. No. 640,668
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—189



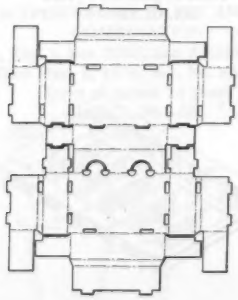
244,582
EGG CARTON
Jørgen Nilaus Petersen, Lyngby, Denmark, assignor to Aktieselskabet Brodrene Hartmann, Lyngby, Denmark
Filed July 17, 1975, Ser. No. 596,633
Claims priority, application Denmark, Jan. 27, 1975, 7575/75
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—190



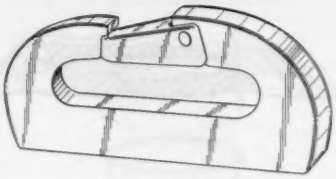
244,583
DISPENSING CONTAINER
Robert A. Barish, Trenton, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.
Filed June 9, 1975, Ser. No. 585,005
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—236



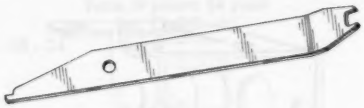
244,584
BOX BLANK
Vernard S. Booth, Albany, Ga., assignor to Olinkraft, Inc., West Monroe, La.
Filed Oct. 1, 1975, Ser. No. 618,524
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—245



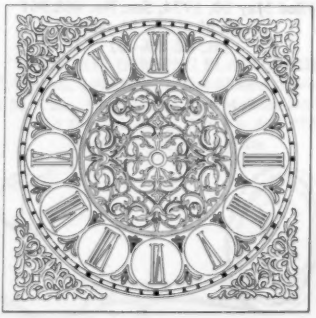
244,585
COUPLING HOOK
Per Erland Jonsson, Smalandsvagen 19, S-826 00 Soderhamn, Sweden
Filed Nov. 8, 1974, Ser. No. 522,182
Term of patent 14 years
Int. Cl. D8—*99*
U.S. Cl. D8—367



244,586
SPARK PLUG GAP MEASURING AND ADJUSTING TOOL
James O. Boord, Toledo, Ohio, assignor to Champion Spark Plug Company, Toledo, Ohio
Filed Apr. 26, 1976, Ser. No. 680,238
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—64



244,587
CLOCK FACE
Jane K. Molyneux, Carmel; Albert J. Day; Regina M. Day, both of San Mateo, all of Calif., and Theo E. Kaiser, Schwenningen, Germany, assignors to Molyneux Clocks, Burlingame, Calif.
Filed Mar. 15, 1976, Ser. No. 666,895
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—125

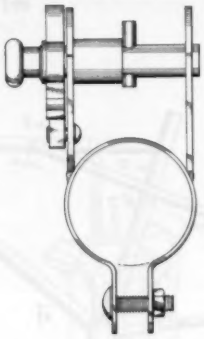


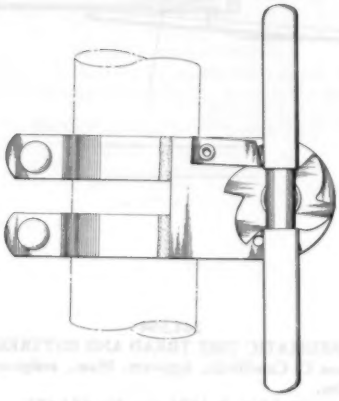
244,588
WATCH FACE
Frederick J. Schwartz, 13330 Bloomfield Ave., Norwalk, Calif. 90650
Filed Dec. 15, 1975, Ser. No. 641,097
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—126

244,589
FINGER RING SETTING
Stanley M. Rosenfeld, 467 Kelton St., Los Angeles, Calif. 90024
Filed Nov. 29, 1976, Ser. No. 745,553
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—34

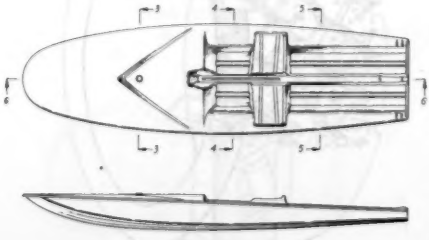
244,590
FINGER RING SETTING
Stanley M. Rosenfeld, 467 Kelton St., Los Angeles, Calif. 90024
Filed Nov. 29, 1976, Ser. No. 745,954
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—34

244,591
TIGHTENING WINCH FOR TENNIS NETS AND THE LIKE
Stanley A. Germain, Glendale, Calif., assignor to L.A. Steelcraft Products, Inc., Pasadena,, Calif.
Filed Oct. 14, 1975, Ser. No. 621,734
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D12—54

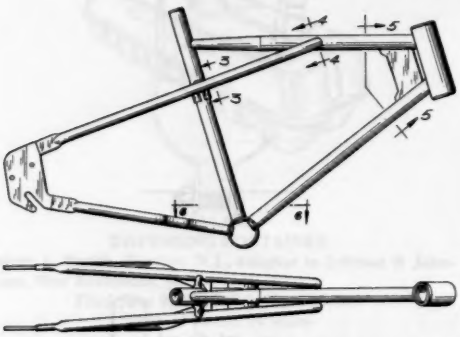




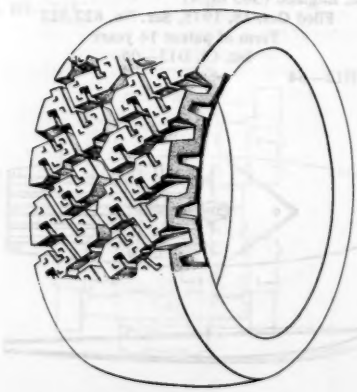
244,592
SAILING BOAT
Douglas B. I. Proctor, Fenmead, Brook Ave., Warsash, Southampton, England (S03 6HN)
Filed Oct. 15, 1975, Ser. No. 622,522
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—64



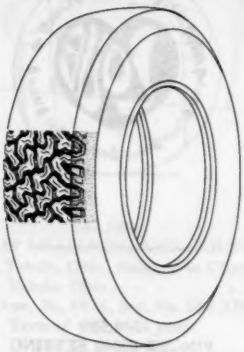
244,593
BICYCLE FRAME
William L. Manofsky, and Dennis C. Patterson, both of Nashville, Tenn., assignors to The Murray Ohio Manufacturing Company, Brentwood, Tenn.
Filed Nov. 6, 1975, Ser. No. 629,553
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—111



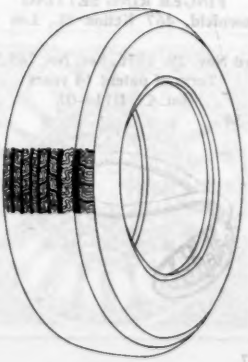
244,594
PNEUMATIC TIRE TREAD AND BUTTRESS
Gerassimos C. Candiliotis, Agawam, Mass., assignor to Uniroyal Inc.
Filed Feb. 2, 1976, Ser. No. 654,682
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—147



244,595
TIRE
Charles G. Yurkovich, Boardman, Ohio, and Harold D. Fetty, Birmingham, Mich., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Feb. 5, 1976, Ser. No. 655,354
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—147



244,596
TIRE
Harold D. Fetty, Birmingham, Mich., and Charles W. Roberts, Akron, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed June 21, 1976, Ser. No. 697,802
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—147



244,597

TOOTH FOR DREDGE CUTTER HEAD OR THE LIKE

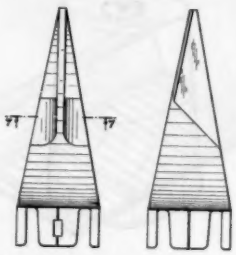
Stephen M. Bowes, Jr., Jacksonville, Fla., assignor to Florida Machine & Foundry Co., Jacksonville, Fla.

Filed Jan. 26, 1976, Ser. No. 652,214

Term of patent 14 years

Int. Cl. D15—*04*

U.S. Cl. D15—29



244,598

POWDER DETERGENT DISPENSER FOR USE WITH REMOTELY LOCATED WASHING MACHINES

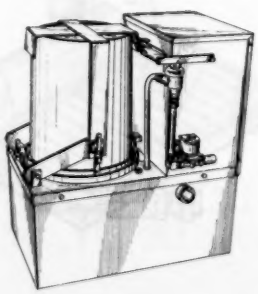
David L. Nystuen, Bloomington; Robert B. Moffatt, West St. Paul, and Thomas H. Imdieke, Hastings, all of Minn., assignors to Economics Laboratory, Inc., St. Paul, Minn.

Filed Feb. 10, 1975, Ser. No. 548,273

Term of patent 14 years

Int. Cl. D15—*99*, *05*

U.S. Cl. D15—199



244,599

TIRE CHANGER OR SIMILAR ARTICLE

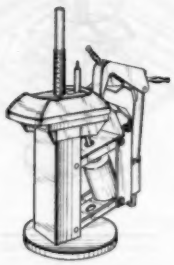
Charles L. Cunningham, Nashville, and Jimmie L. Holladay, Antioch, both of Tenn., assignors to The Coats Company, Inc., La Vergne, Tenn.

Filed July 26, 1976, Ser. No. 708,705

Term of patent 14 years

Int. Cl. D15—*99*

U.S. Cl. D15—199



244,600

TIRE CHANGER OR SIMILAR ARTICLE

Charles L. Cunningham, Nashville, and Jimmie L. Holladay, Antioch, both of Tenn., assignors to The Coats Company, Inc., La Vergne, Tenn.

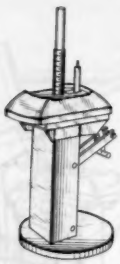
Filed July 26, 1976, Ser. No. 708,706

Term of patent 14 years

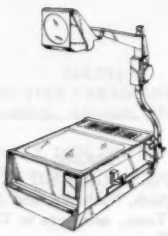
Int. Cl. D15—*99*

U.S. Cl. D15—199

244,601
TIRE CHANGER OR SIMILAR ARTICLE
Charles L. Cunningham, Nashville, and Jimmie L. Holladay, Antioch, both of Tenn., assignors to The Coats Company, Inc., La Vergne, Tenn.
Filed July 26, 1976, Ser. No. 708,707
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—199

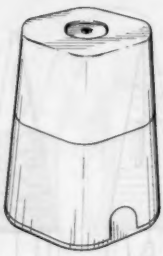


244,602
OVERHEAD PROJECTOR
Joseph R. Mango, Midlothian, and Donald G. Wolfe, Lake Barrington, both of Ill., assignors to Minnesota Mining and Manufacturing Company
Filed Mar. 3, 1975, Ser. No. 554,419
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D16—24

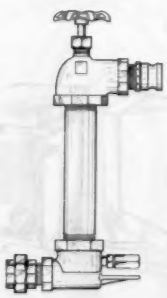


244,603
PAIR OF SPECTACLES
David W. Johnsen, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.
Filed Oct. 28, 1975, Ser. No. 625,983
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

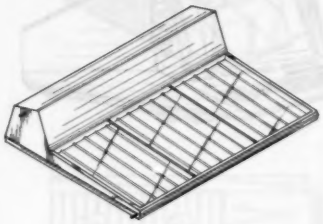
244,604
CORDLESS ELECTRIC PENCIL SHARPENER
Yoshiro Ohta, Tokyo, Japan, assignor to Esquire Trading Co., Ltd., Tokyo, Japan
Filed Dec. 31, 1975, Ser. No. 645,865
Claims priority, application Japan, Oct. 1, 1975, 50-039665
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—73



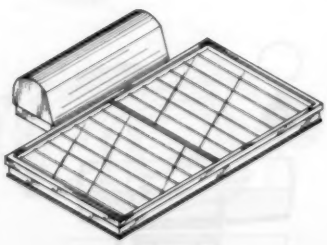
244,605
FROSTPROOF HYDRANT
H. Ronald Ratnik, 222 Weymouth Drive, Rochester, N.Y. 14625
Filed Nov. 5, 1975, Ser. No. 629,044
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—12



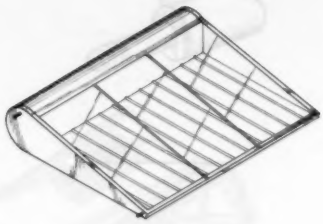
244,606
SOLAR WATER HEATING UNIT
Harry John Riley, Perth, Australia, assignor to S. W. Hart & Co. Pty. Ltd., Australia
Filed Sept. 17, 1975, Ser. No. 614,095
Claims priority, application Australia, July 29, 1975, 67474/75
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—127



244,607
SOLAR WATER HEATING UNIT
Harry John Riley, Perth, Australia, assignor to S. W. Hart & Co. Pty. Ltd., Australia
Filed Sept. 17, 1975, Ser. No. 614,096
Claims priority, application Australia, July 29, 1975, 67473/75
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—127

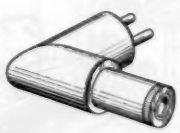


244,608
SOLAR WATER HEATING UNIT
Harry John Riley, Perth, Australia, assignor to S. W. Hart & Co. Pty. Ltd., Australia
Filed Sept. 17, 1975, Ser. No. 614,097
Claims priority, application Australia, July 29, 1975, 67470/75
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—127

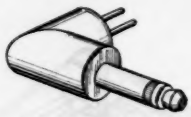


244,609
DENTAL FLOSS HOLDER
Ingram S. Chodorow, Stamford, Conn., assignor to Placontrol, Inc., Stamford, Conn.
Filed Oct. 31, 1975, Ser. No. 627,881
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D28—64

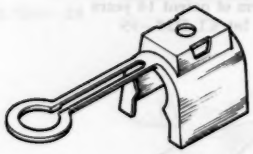
244,610
ELECTRICAL ANGLE PLUG
James J. Gietzen, Smithtown, N.Y., assignor to Dynamic Instrument Corporation, Hauppauge, N.Y.
Filed Oct. 24, 1975, Ser. No. 625,537
Term of patent 7 years
Int. Cl. D13—*03*
U.S. Cl. D13—28



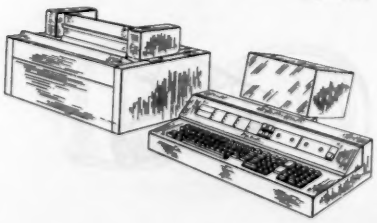
244,611
ELECTRICAL ANGLE PLUG
James J. Gietzen, Smithtown, N.Y., assignor to Dynamic Instrument Corporation, Hauppauge, N.Y.
Filed Oct. 24, 1975, Ser. No. 625,539
Term of patent 7 years
Int. Cl. D13—*03*
U.S. Cl. D13—28



244,612
ELECTRICAL CONNECTOR RETAINING CLIP
Edgar Burns, Los Angeles, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.
Filed Jan. 12, 1976, Ser. No. 648,265
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—24

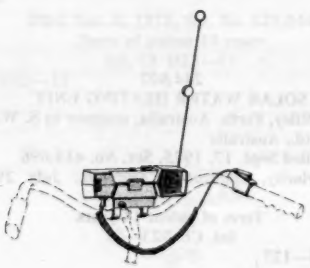


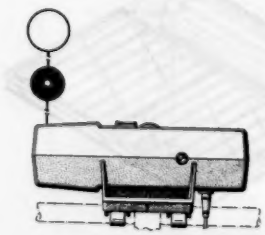
244,613
DESK-TOP ACCOUNTING TERMINAL
Ettore Sottsass, Jr., Milan, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy
Filed Mar. 12, 1975, Ser. No. 557,738
Claims priority, application Italy, Sept. 18, 1974, 53457/74
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D14—45



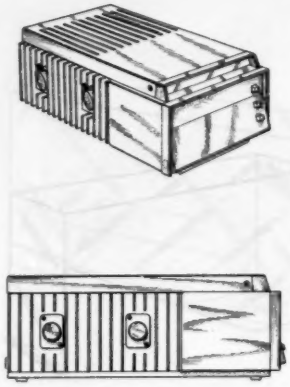
244,614
COMPUTING SYSTEM
Jack Arthur Gilmore, Aloha; Garry Mitchell Burgess, Beaverton; Sidney Hubert Broughton, Portland, and Martha Jane Rowland, Aloha, all of Oreg., assignors to Tektronix, Inc.
Filed Oct. 24, 1975, Ser. No. 625,610
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—43

244,615
BICYCLE MOUNTED TRANSCEIVER
James F. Mariol, Cincinnati, Ohio, assignor to Wood, Herron & Evans, Cincinnati, Ohio
Filed Sept. 29, 1975, Ser. No. 617,785
Term of patent 14 years
Int. Cl. D14—*03*; D8—*08*
U.S. Cl. D14—68

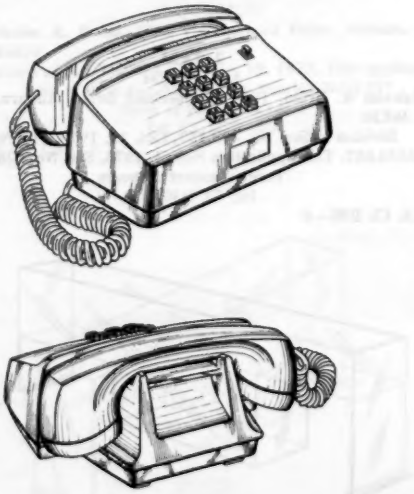




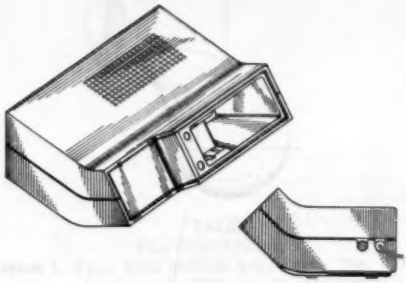
244,616
POWER AMPLIFIER
Stuart Walter Sizer, Harbert, Mich., assignor to Heath Company, Benton Harbor, Mich.
Filed Oct. 28, 1975, Ser. No. 626,506
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—96



244,617
TELEPHONE INSTRUMENT
Carl-Arne Breger, Stockholm, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden
Filed Mar. 22, 1976, Ser. No. 669,329
Claims priority, application Sweden, Sept. 24, 1975, 75.1867
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53



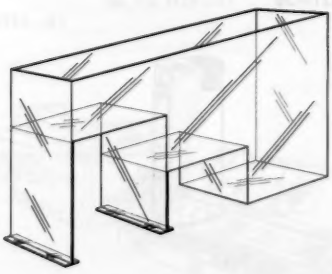
244,618
COMBINATION BATTERY CHARGER, RECEIVER AND AMPLIFIER OR SIMILAR ARTICLE
Arnold Sherwin Goldman, Plantation, and Richard John Toth, Oakland Park, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Mar. 8, 1976, Ser. No. 664,854
Term of patent 14 years
Int. Cl. D13—*02*; D14—*03*
U.S. Cl. D13—5



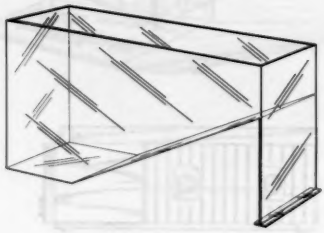
244,619
LIGHTER FOR SMOKERS
Guy Neyret, Francheville, France, assignor to Interfeudor S.A., Geneva, Switzerland
Filed Oct. 14, 1975, Ser. No. 622,180
Claims priority, application France, Apr. 24, 1975, 75.73813
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—36

244,620
HANGING BIRDHOUSE
Patrick J. Cudmore, Duxbury, Mass., assignor to Wave-Rider, Incorporated, Duxbury, Mass.
Filed Dec. 29, 1975, Ser. No. 645,313
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—3

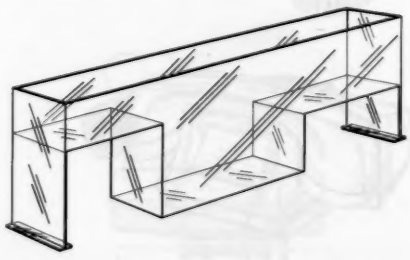
244,621
AQUARIUM
Malcolm R. Braid, 1005 Cumberland Drive, Auburn, Ala. 36830
Division of Ser. No. 408,157, Oct. 19, 1973. This application Nov. 3, 1975, Ser. No. 628,155, Pat. No. D238,687
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—6



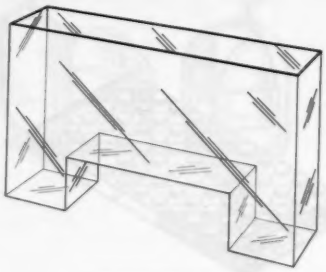
244,622
AQUARIUM
Malcolm R. Braid, 1005 Cumberland Drive, Auburn, Ala. 36830
Division of Ser. No. 408,157, Oct. 19, 1973, Pat. No. D238,687. This application Nov. 3, 1975, Ser. No. 628,156
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—6



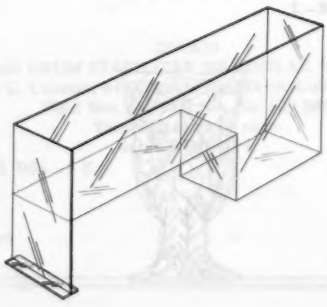
244,623
AQUARIUM
Malcolm R. Braid, 1005 Cumberland Drive, Auburn, Ala. 36830
Division of Ser. No. 408,157, Oct. 19, 1973, Pat. No. D238,687. This application Nov. 3, 1975, Ser. No. 628,157
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—6



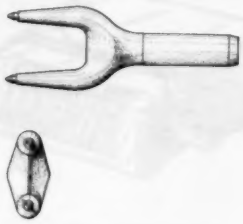
244,624
AQUARIUM
Malcolm R. Braid, 1005 Cumberland Drive, Auburn, Ala. 36830
Division of Ser. No. 408,157, Oct. 19, 1973, Pat. No. D238,687. This application Nov. 3, 1975, Ser. No. 628,364
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—6



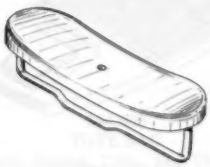
244,625
AQUARIUM
Malcolm R. Braid, 1005 Cumberland Drive, Auburn, Ala. 36830
Division of Ser. No. 408,157, Oct. 19, 1973. This application Nov. 3, 1975, Ser. No. 628,365, Pat. No. D238,687
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—6



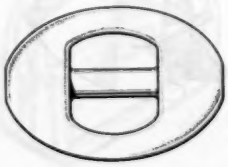
244,626
HEAD FOR A CATTLE PROD OR SIMILAR ARTICLE
James S. Andrews, Westminister, Colo., assignor to The Magrath Company, McCook, Nebr.
Filed June 3, 1976, Ser. No. 692,567
Term of patent 14 years
Int. Cl. D30—*05*
U.S. Cl. D30—32



244,627
PLAYGROUND SEAT
Vernon L. Ryan, 6802 Millikin Ave., Austin, Tex. 78723
Filed Oct. 3, 1975, Ser. No. 619,250
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 L

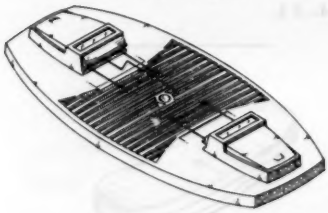


244,628
DUMBBELL
Forrest S. Wright, 2821 Patrick Henry Drive, Apt. 307, Auburn Heights, Mich. 48507
Filed Oct. 24, 1975, Ser. No. 625,440
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 K



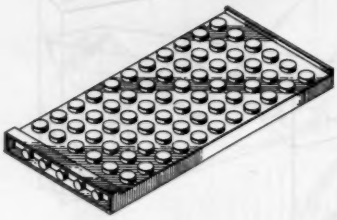
244,629
BARBELL
Forrest S. Wright, 2821 Patrick Henry Drive, Apt. 307, Auburn Heights, Mich. 48507
Filed Oct. 24, 1975, Ser. No. 625,442
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 K

244,630
GOLF CLUB SWING MONITOR
Alois Krawagna, Toronto, Canada, assignor to Ian R. Campbell, Islington, Canada
Filed Jan. 28, 1976, Ser. No. 653,159
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 CB



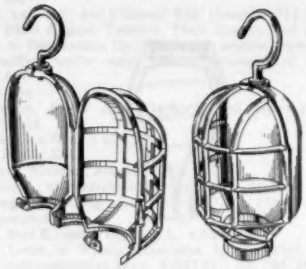
244,631
ROCKING TOY
Eric Kyte, Ilkley, England, assignor to Bulldog Toy Company Limited, Leeds, England
Filed Dec. 11, 1975, Ser. No. 639,733
Claims priority, application United Kingdom, June 12, 1975, 971459/75
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AE

244,632
TOY CONSTRUCTION PIECE
Godtfred Kirk Christiansen, Billund, Denmark, assignor to Interlego A.G., Zug, Switzerland
Filed Sept. 16, 1975, Ser. No. 613,743
Claims priority, application Denmark, Mar. 25, 1975, 253/75
Term of patent 3½ years
Int. Cl. D21—*01*
U.S. Cl. D34—15 GG

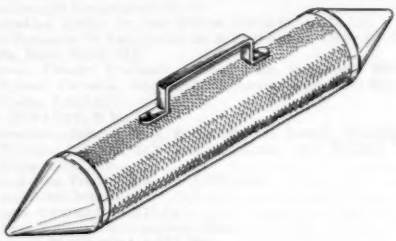


244,633
CANDLE CUP
Robert F. Ball, 2010 Richards Road, Willow Grove, Pa. 19090
Filed Dec. 22, 1975, Ser. No. 643,365
The portion of the term of this patent subsequent to Apr. 8, 1989, has been disclaimed.
Term of patent 14 years
Int. Cl. D26—*01*
U.S. Cl. D48—2

244,634
LAMP GUARD
Bernard J. Tamarin, Philadelphia, Pa., assignor to The Vacuum Cleaner Corporation of America
Filed Dec. 15, 1975, Ser. No. 640,539
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—16 B

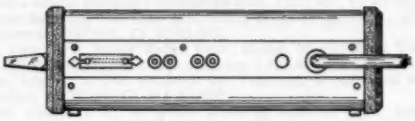


244,635
COMBINED GUIRO AND SHAKER
Martin B. Cohen, 68 Saddlewood Drive, Hillsdale, N.J. 07642
Continuation-in-part of Ser. No. 482,047, June 24, 1974, abandoned. This application Oct. 30, 1975, Ser. No. 627,404
Term of patent 14 years
Int. Cl. D17—*04*
U.S. Cl. D56—1 E



244,636
BASS DRUM STABILIZER OR SIMILAR ARTICLE
Joseph G. Cocuzzo, 84 D Marion Pepe Drive, Lodi, N.J. 07644
Filed Nov. 6, 1975, Ser. No. 629,666
Term of patent 14 years
Int. Cl. D17—*99*
U.S. Cl. D56—1 E

244,637
PULMONARY FUNCTION TESTER COMPUTER
Bernard N. Gray, East Pepperell, Mass., assignor to Life Support Equipment Corporation, Woburn, Mass.
Filed Sept. 13, 1976, Ser. No. 723,048
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—17



244,638
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John A. Artmann, Denver, Colo., and Thomas D. Tweedie, Monrovia, Calif., assignors to Samsonite Corporation, Denver, Colo.
Filed Mar. 21, 1975, Ser. No. 560,335
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—3 F

244,639
CARRYING CASE

Kurt D. Greenbaum, New York, N.Y., assignor to Ikelheimer-Ernst, Inc., New York, N.Y.

Filed Aug. 14, 1975, Ser. No. 604,577
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 F

244,640
ELECTRIC SHAVER

Douglas George Long, Lombard, Ill., assignor to Sunbeam Corporation, Chicago, Ill.

Filed Jan. 29, 1976, Ser. No. 653,438
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—51

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AB Volvo Penta: *See—*
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Adams, Thomas F. Pallet truck for use with fork lift truck. 4,027,771, Cl. 214-621.000.

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Adler, Franklin P.; and Pavolka, John D., to Pullman Incorporated. Pressure probe unloading device for pneumatic operated discharge gates. 4,027,921, Cl. 302-52.000.

Adler, Stanford L., to Technicon Instruments Corporation. Sample mixer and spreader. 4,027,623, Cl. 118-108.000.

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Alexander, Ernest John; and Mooradian, Aram, to Sterling Drug Inc. 9-Benzoyl,3-hydroxymethyl-1,2,3,4-tetrahydro-carbazole. 4,028,382, Cl. 260-315.000.

Alexandre, Philippe, to Societe Generale de Constructions Electriques et Mecaniques (Alsthom). Method for adjusting an automatic sluice with a view to ensuring a determined level. 4,027,487, Cl. 61-25.000.

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Allard, Frederick C., to United States of America, Navy. Inertial optical stabilizer. 4,027,540, Cl. 74-5.100.

Allegheny Ludlum Industries, Inc.: *See—*
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Allen, Robert K., to Marvin Glass & Associates. Wheeled vehicle construction kit. 4,027,421, Cl. 46-17.000.

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Bud, Hans; and Alway, Peter, 4,028,530.

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American Air Filter Company, Inc.: *See—*
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Li, Tsi Tieh; and Saxon, Robert, 4,028,305.
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Ammann, Paul R.; Cook, Glenn M.; and Portal, Charles, to Kennecott Copper Corporation. Direct electrochemical recovery of copper from dilute ammoniacal solutions. 4,028,202, Cl. 204-106.000.
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Amort, Jurgen; and Nestler, Heinz, to Dynamit Nobel Aktiengesellschaft. Organofunctional silicon compounds as adhesivizers for organic binding agents. 4,028,343, Cl. 260-59.00R.
AMP Incorporated: *See—*
Asick, John Carl, 4,027,368.
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Baltisberger, Kurt, to BBC Brown Boveri & Company Limited. Stator winding structure for dynamo-electric machine. 4,028,572, Cl. 310-201.000.
Bando, Tomoyuki: *See—*
Hotta, Seiji; Koga, Koichi; Bando, Tomoyuki; and Kondo, Yutaka, 4,028,331.
Banike, Ronald A.: *See—*
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Banker, John G.; and Wigginton, Hubert L., to United States of America, Energy Research and Development Administration. Method of melting metals to reduce contamination from crucibles. 4,028,096, Cl. 75-20.00R.
Bar-on, Ari, to Xerox Corporation. Stripper finger and combination mounting means therefor. 4,028,050, Cl. 432-59.000.
Barakat, Farouk: *See—*
Plockinger, Erwin; Daghofer, Otto; and Barakat, Farouk, 4,027,720.
Barber-Colman Company: *See—*
Bailey, Ronald L., 4,028,737.
Barlow, Gordon A.; and Katzman, Allison W., to Marvin Glass & Associates. Doll with oversize shoes and securing means therefor. 4,027,423, Cl. 46-116.000.
Barney, Gary S.; and Brownell, Lloyd E., to United States of America, Energy Research and Development Administration. Process for converting sodium nitrate-containing, caustic liquid radioactive wastes to solid insoluble products. 4,028,265, Cl. 252-301.10W.
Barnum, Ronald E.; Tefft, Franklin A.; and Cotton, Louis S., to United Technologies Corporation. Helicopter warning system. 4,027,838, Cl. 244-17.110.
Barrette, Marcellin: *See—*
Bibeau, Marcel; and Barrette, Marcellin, 4,027,787.
Bartel, William J.; and Burton, Robert S., III, to Occidental Petroleum Corporation. Method for igniting the top surface of oil shale in an in situ retort. 4,027,917, Cl. 299-2.000.
Barto, Robert W.; and Brown, Leonard A. Refrigerator water reservoir assembly for automatically supplying water to the ice maker from the reservoir. 4,027,499, Cl. 62-340.000.
BASF Aktiengesellschaft: *See—*
Hromatka, Otto; and Binder, Dieter, 4,028,373.
Batori, Michael C. Method for aiming a billiards bank shot. 4,027,883, Cl. 273-14.000.
Bauer Kaba AG. Sicherheits-Schliessysteme: *See—*
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Kramer, Wolfgang; Draber, Wilfried; Timmler, Helmut; and Forster, Heinz, 4,028,409.
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Prinz, Richard; Elghani, Salah Elabd; Fischer, Winfried; and Alberts, Heinrich, 4,028,433.
Rottloff, Gunther; Sundermann, Rudolf; Grigat, Ernst; and Putter, Rolf, 4,028,393.
Schafer, Walter; Wagner, Kuno; and Muller, Hans-Jurgen, 4,028,310.
Schwarz, Hans-Helmut; and Immel, Otto, 4,028,347.
Wagner, Kuno; and Hajek, Manfred, 4,028,306.
Bays, David Edmund; and Foster, Roy Vivian, to Allen & Hanburys Limited. Acetic acid derivatives. 4,028,404, Cl. 260-515.00R.
BBC Brown Boveri & Company Limited: *See—*
Baltisberger, Kurt, 4,028,572.
Canay, Muzaffer, 4,028,574.
Greenwood, John H.; and Robitschek, Emmerich, 4,027,865.
Beam Systems Israel Ltd.: *See—*
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Becker, Kenneth W.: *See—*
Sullivan, Daniel S., 3rd; Strubelt, Charles E.; and Becker, Kenneth W., 4,028,268.
Becker, Mitchell; and Yang, Charles C., to Halcon International, Inc. Recovery of alkylene glycols by distillation with aqueous organic acid. 4,028,195, Cl. 203-38.000.
Beckman Instruments G.m.b.H.: *See—*
Schmider, Paul, 4,027,622.
Beckman Instruments, Inc.: *See—*
Kaye, Wilbur I., 4,027,973.
Beckmann, Georg, to Siempelkamp Giesserei KG. Gravity-type steam accumulator. 4,027,690, Cl. 137-154.000.
Beecham Group Limited: *See—*
Clark, Judith Ann, 4,028,415.
Behrend, William Louis, to RCA Corporation. Sideband analyzer for AM transmitters. 4,028,625, Cl. 325-133.000.
Beinert, Klaus; and Weidner, Herbert, to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH. Device for making monocrystalline gallium arsenide. 4,028,058, Cl. 23-273.0SP.
Belknap, Donald J. Methods of making incandescent lamps. 4,027,363, Cl. 29-25.150.
Belknap, Donald J. Lamp component transport device. 4,027,804, Cl. 214-1.0BV.
Bell & Howell Company: *See—*
Browder, Lewis B., 4,028,729.
Bell, Robert Joseph; and Simmons, James Almy, to O. M. Scott & Sons Company, The. Fungicide compositions for the control of snowmold. 4,028,464, Cl. 424-273.000.
Bell Telephone Laboratories, Incorporated: *See—*
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Bendix Corporation, The: *See—*
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Bennett, Robert F.; Brouwer, Nicholaas L.; and Stricker, David M., to Aluminum Company of America. System for determining tube eccentricity. 4,027,527, Cl. 73-67.80S.
Bentley, Arthur P. Pulse multiplier for surface operated single tube pump. 4,028,013, Cl. 417-390.000.
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Berberich, Norbert J., Jr.: *See—*
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Berendsen, Jules Robert; Pollet, Robert Joseph; Philippaerts, Herman Adelbert; Sels, Francis Jeanne; and Willems, Jozef Frans, to AGFA-GEVAERT, N.V. Development of exposed lith-emulsions. 4,028,110, Cl. 96-66.300.
Berg, Adolf. Fire-resistant walls for use in shipbuilding. 4,027,444, Cl. 52-240.000.
Berg, Albert T., Jr.; and Langlie, Howard. Plastic nail-on electric fence insulator. 4,028,489, Cl. 174-166.00R.
Berger, Frank M. Analgesic compositions comprising dextro-propoxyphene and benzodiazepine and process. 4,028,466, Cl. 424-244.000.
Berger, Frank M. Analgesic compositions comprising levo-propoxyphene and benzo diazepine and process. 4,028,467, Cl. 424-244.000.
Berger, Harald: *See—*
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Bergmans, Hendrik Jan, to U.S. Philips Corporation. Direct-current motor comprising an electronic commutator. 4,028,598, Cl. 318-138.000.
Berkowitz, Benjamin; Luedtke, Arthur; Kilpatrick, William L.; and Bentley, William F., Jr., to United States of America, Federal Communications Commission. Adjustable yagi antenna. 4,028,709, Cl. 343-819.000.
Berkowitz, Irving L., to Kason Hardware Corporation. Joining device for connecting tubes. 4,027,987, Cl. 403-172.000.
Berkowitz, Murray, to Curtiss-Wright Corporation. Rotary trochoidal compressor with compressible sealing. 4,028,021, Cl. 418-56.000.
Bernard, Clay, II; Matheny, William F., III; and Parker, Billy J., to Clay Bernard Systems International Ltd. Article transfer system. 4,027,833, Cl. 243-31.000.
Berry, Clyde F. Steam track turbine. 4,027,995, Cl. 415-92.000.
Beta Corporation: *See—*
Volk, Joseph A., Jr., 4,028,552.
Beuchee, Daniel; and Leclair, Alain, to U.S. Philips Corporation.

Control circuit for a switched-mode power supply, particularly for a television receiver. 4,028,606, Cl. 321-2.000.

Beumer, Bernhard; and Jendrzey, Wolfram, to B. Beumer Maschinenfabrik KG. Automatic loading apparatus for loading discrete cargo, particularly sacks, onto stationary or mobile loading platforms. 4,027,805, Cl. 214-6.00G.

Bezicot, Robert: *See—*
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Bianchi, Frank Joseph, Jr.: *See—*
Ochodnicky, Samuel Steven; and Bianchi, Frank Joseph, Jr., 4,027,516.

Bibeau, Marcel; and Barrette, Marcellin. Shipping container. 4,027,787, Cl. 222-166.000.

Biddison, John M., to Globe Tool and Engineering Company, The. Automatic armature winding. 4,027,827, Cl. 242-7.05B.

Bigham, Clifford B., to Atomic Energy of Canada Limited. High power-double strapped vane type magnetron. 4,028,583, Cl. 315-39.690.

Bihuniak, Peter P.; and Guile, Donald L., to Corning Glass Works. Method of enhancing the refractoriness of high purity fused silica. 4,028,124, Cl. 106-69.000.

Bilson, Edward A.: *See—*
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Binder, Dieter: *See—*
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Bio-Rad Laboratories: *See—*
Lewin, Nathan; and Wong, Emmy Tong-In, 4,028,465.

Bioresearch Limited: *See—*
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Bishop, Peter, to United Industrial Syndicate, Inc. Anti-static bar. 4,028,590, Cl. 361-220.000.

Bishop, Thomas Desmond, to Deritend Engineering Company Limited, The. Sheet handling apparatus. 4,027,873, Cl. 271-197.000.

Bishop, Thomas R.: *See—*
Slator, Damon T.; Bishop, Thomas R.; and Peil, Archie W., 4,027,816.

Bite, Pal; Moravcsik, Imre; Schafer, Inge; Horvath, Gyula; Mehesfalvi nee Vajna, Zsuzsanna; Borvendeg, Janos; and Hermann nee Szente, Ilona, to Richter Gedeon Vegyeszeti Gyar RT. 6-Amino-5β,19-cycloandrostane derivatives. 4,028,348, Cl. 260-239.500.

Bitzer, Diethelm; and Lohmann, Dieter, to Ciba-Geigy Corporation. Carbo-nitriding process using nitriles. 4,028,142, Cl. 148-16.500.

Bitzer, Hans Eugen, to C. Terrot Sohne, Firma. Draw-off and take-up arrangement for circular knitting machines. 4,027,506, Cl. 66-149.00R.

Black, Chester A.; and Black, Lester A. Detachable road protecting device for tracked vehicles. 4,027,925, Cl. 305-46.000.

Black, Christopher T.; and Lear, Anthony, to Texas Instruments Incorporated. Fast switching Darlington circuit. 4,028,561, Cl. 307-300.000.

Black and Decker Manufacturing Company, The: *See—*
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Black, Lester A.: *See—*
Black, Chester A.; and Black, Lester A., 4,027,925.

Blackburn, Dale W., to SmithKline Corporation. Cephalosporin purification process. 4,028,355, Cl. 260-243.00C.

Blair, Peter Kenneth, to International Standard Electric Corporation. Vehicle position indicator with radar interrogation each of spaced transponders disposed along a pathway for the vehicle. 4,027,840, Cl. 246-122.00R.

Blanke, Richard H., Jr. Pail assemblies. 4,027,777, Cl. 220-295.000.

Blaschke, Felix; and Klautschek, Herwig, to Siemens Aktiengesellschaft. Method and apparatus for slow speed operation of an inverter controlled rotating field machine. 4,028,600, Cl. 318-227.000.

Blass, Judd, to Beam Systems Israel Ltd. Broadband ferrite transformer-fed whip antenna. 4,028,704, Cl. 343-715.000.

Block, Hans-Dieter: *See—*
Konter, Wolfgang; Witte, Josef; Vehlewald, Peter; and Block, Hans-Dieter, 4,028,434.

Bloom, Stanley: *See—*
Anderson, Charles Hammond; and Bloom, Stanley, 4,028,582.

Bloxam, James M. Portable automotive test probe. 4,028,621, Cl. 324-51.000.

Blue Bird Body Company (Entire): *See—*
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Bocion, Pierre; De Silva, Wijitha; and Winternitz, Pavol, to Hoffmann-La Roche Inc. Plant growth influencers. 4,028,089, Cl. 71-88.000.

Bodanszky, Miklos; and Sheehan, John Timothy, to E. R. Squibb & Sons, Inc. Solid phase synthesis of peptides. 4,028,315, Cl. 260-78.00A.

Bodensieck, Ernest J., to Garrett Corporation, The. Bearing assembly and method. 4,027,930, Cl. 308-202.000.

Bodnar, Ernest Robert. Method and apparatus for embossing sheet metal strip and sheet metal panel. 4,027,517, Cl. 72-177.000.

Bodor, Nicolae S.; and Yuan, Sun-Shine, to Interx Research Corporation. Novel intermediates useful in the synthesis of optically active m-acyloxy-α-[(methylamino)methyl]benzyl alcohols. 4,028,368, Cl. 260-295.00R.

Bodtmann, William Fred; and Ruthroff, Clyde Leslie, to Bell Telephone Laboratories, Incorporated. Linear phase modulator including a pair of Armstrong modulators. 4,028,641, Cl. 332-18.000.

Bogan, Richard T.; and Shelton, Claude M., to Eastman Kodak Company. Melt phase process for the preparation of emulsifiable polyethylene waxes. 4,028,436, Cl. 260-878.00R.

Bohlin, Karl Gunnar; Eriksson, Karl Rune; and Gustafsson, Carl-Erik, to SCA Development Aktiebolag. Load-weighing device. 4,027,736, Cl. 177-147.000.

Bohner, Beat: *See—*
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Bolex International SA: *See—*
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Bolto, Brian Alfred; and Eldridge, Robert James, to ICI Australia Limited; and Commonwealth Scientific and Industrial Research Organization. Preparation of polymer composites. 4,028,255, Cl. 210-500.00R.

Bonaddio, Robert M., to PPG Industries, Inc. Force applying device for scoring wheels. 4,027,562, Cl. 83-8.000.

Bond, William C., Jr.; and Wahlborg, Harold J., to Copolymer Rubber & Chemical Corporation. EPDM interpolymers formed with unsaturated organosilanes. 4,028,483, Cl. 526-279.000.

Bondar, Martin Moses: *See—*
Frech, Roger Alvan; and Bondar, Martin Moses, 4,027,870.

Bonney, Roland W. Rotary valve. 4,027,697, Cl. 137-596.000.

Bonnice, Phillip E., to General Electric Company. Grinding wheel dressing method. 4,027,648, Cl. 125-11.00R.

Booth, Inc.: *See—*
Branch, William C.; Cole, Oliver W.; and Kidd, Robert P., 4,027,783.

Border, Gary Clayton: *See—*
Patznick, Richard Arthur; and Border, Gary Clayton, 4,028,083.

Borejko, Stefan: *See—*
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Borg-Warner Corporation: *See—*
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Radke, Edmund John; and Bair, Joseph Louis, 4,027,757.

Borkowski, Walter L.; and Schneider, Abraham, to Suntech, Inc. Explosive composition containing high density hydrocarbon liquid. 4,028,152, Cl. 149-46.000.

Borror, Alan L., to Polaroid Corporation. Novel chemical compounds. 4,028,353, Cl. 260-240.600.

Borvendeg, Janos: *See—*
Bite, Pal; Moravcsik, Imre; Schafer, Inge; Horvath, Gyula; Mehesfalvi nee Vajna, Zsuzsanna; Borvendeg, Janos; and Hermann nee Szente, Ilona, 4,028,348.

Boudouris, Georges; Kalopissis, Gregoire; Leveque, Jean-Luc; and Roussopoulos, Paul, to L'Oreal. Device for superficially heating an adjacent body. 4,028,518, Cl. 219-10.810.

Bouteille, Daniel; Hardouin, Pierre; and Thomasse, Andre, to La Telemecanique Electrique. System allowing the realization of logic circuits by juxtaposition of pneumatic elements. 4,027,692, Cl. 137-270.000.

Bowen Tools, Inc.: *See—*
Slator, Damon T.; Bishop, Thomas R.; and Peil, Archie W., 4,027,816.

Bowen, Woodrow L.; and Moore, Harlan D. Silver recovery apparatus. 4,028,212, Cl. 204-272.000.

Boyd, David M., to UOP Inc. Systematized method and control of fractionation heat balance. 4,028,194, Cl. 203-2.000.

Boylan, John R.: *See—*
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BP Trading Limited: *See—*
Armstrong, Robert James; and Cook, Boyd Stanley, 4,027,399.

Bram, Georges Eugene, to Pont-A-Mousson S.A. Device for a tensile locking of pipe elements. 4,027,904, Cl. 285-297.000.

Branch, William C.; Cole, Oliver W.; and Kidd, Robert P., to Booth, Inc. Tallying beverage dispenser. 4,027,783, Cl. 222-26.000.

Brandenstein, Manfred: *See—*
Kunkel, Heinrich; Brandenstein, Manfred; Olschewski, Armin; Finzel, Sigismund; Gossmann, Willi; and Horling, Peter, 4,027,932.

Branson Ultrasonics Corporation: *See—*
Bachar, John J., 4,027,370.
Bryant, Ronald K., 4,028,033.

Brant, Robert D., to Palmer Paint Products, Inc. Paint set and teaching aid. 4,027,404, Cl. 35-28.500.

Braukmann, Bernhard W. Valve disc and seat construction. 4,027,852, Cl. 251-333.000.

Braun, Walter; and Hoffmann, Gunter, to Aluminium Norf GmbH. Apparatus for scrubbing of hydrocarbons from gas. 4,028,072, Cl. 55-195.000.

Brehm, Gustav, to Heberlein Maschinenfabrik AG. Process for continuously treating thermoplastic yarns. 4,027,466, Cl. 57-34.0HS.

Bremner, Ean Grant: *See—*
Faktor, Marc Marian; Ambridge, Thomas; and Bremner, Ean Grant, 4,028,207.

Brennemann, Andrew Ernest; and Soo, Suk Suet, to International Business Machines Corporation. Call progress signal detector. 4,028,493, Cl. 179-2.0DP.

Breslau, Franklin Charles; and Goertzel, Gerald, to International Business Machines Corporation. Asynchronous, hierarchical loop communication system with independent local station control of access to inbound time portions without central control. 4,028,667, Cl. 340-172.500.

Breslow, Jeffrey D.; and Frumkin, Mitchell J., to Marvin Glass & Associates. Game device. 4,027,877, Cl. 273-1.00R.

Bretschneider, Edward S.: *See—*
Rubino, Andrew M.; Jones, John L.; and Bretschneider, Edward S., 4,028,390.

Breuer, Hermann; and Treuner, Uwe D., to E. R. Squibb & Sons, Inc. Alkenyl and alkinylureido cephalosporins. 4,028,354, Cl. 260-243.00C.

Bridge, Donald John Henry, to Finspa Engineering Co. Limited. Joint construction for connecting together two frame members. 4,027,453, Cl. 403-353.000.

Bridgestone Tire Company Limited: *See—*
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Briggs, Robert L., to Aneomstat Products Division, Dynamics Corporation of America. Fire and impact resistant window assembly. 4,027,443, Cl. 52-202.000.

Bright, Gene Michael, to Pfizer Inc. 6-Acylamido-2,2-dimethyl-3-(pyrimidin-4,6-dione-2-yl)-penams and intermediates therefor. 4,028,360, Cl. 260-256.50R.

Brinkman, Earl W., to Davenport Machine Tool. Method for producing sparking wheels. 4,027,376, Cl. 29-417.000.

Brix, Herman Josef, to Girling Limited. Disc brakes for vehicles. 4,027,752, Cl. 188-73.600.

Bronner, Emanuel H. Contraceptive device. 4,027,670, Cl. 128-261.000.

Brooks & Perkins, Incorporated: *See—*
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Brouwer, Nicholaas L.: *See—*
Bennett, Robert F.; Brouwer, Nicholaas L.; and Stricker, David M., 4,027,527.

Browder, Lewis B., to Bell & Howell Company. Provision and display of video signals. 4,028,729, Cl. 358-148.000.

Brown, Allen C.; Hattes, Neil R.; and Eyrick, Theodore B., to Chemetron Corporation. Humidifier and automatic control system therefor. 4,028,444, Cl. 261-122.000.

Brown, Claude V.: *See—*
Needham, Donald G.; Taylor, Kenneth P.; and Brown, Claude V., 4,028,332.

Brown, George L.; and Tobias, Michael A., to Mobil Oil Corporation. Epoxy modified acrylic latices and method of producing same. 4,028,294, Cl. 260-29.6NR.

Brown, Leonard A.: *See—*
Barto, Robert W.; and Brown, Leonard A., 4,027,499.

Brown, Richard E.; and Unangst, Paul C., to Warner-Lambert Company. Indolopyrones having antiallergic activity. 4,028,383, Cl. 260-326.290.

Brown, William F., to Vast Products Inc. Foamed polyester resin. 4,028,289, Cl. 260-2.50N.

Brownell, Lloyd E.: *See—*
Barney, Gary S.; and Brownell, Lloyd E., 4,028,265.

Brownstein, Arthur M.; and Kerr, David L., to Sun Oil Company. Oxidation of aliphatic and alicyclic hydrocarbons. 4,028,423, Cl. 260-610.00B.

Brubaker, Burton D.: *See—*
Cheng, Chin Huan; and Brubaker, Burton D., 4,027,379.

Brucker, Ben B. Hockey glove with improved palm construction. 4,027,339, Cl. 2-16.000.

Brugman, Johannes Antonius Henricus, to Hunter Douglas International N.V. Suspended screen ceiling. 4,027,446, Cl. 52-484.000.

Bruhl, Peter. Device for chill-drying a gas. 4,027,729, Cl. 165-111.000.

Bruins, Antonius Hermanus Nicolaas Maria: *See—*
Panneman, Harm Jan; and Bruins, Antonius Hermanus Nicolaas Maria, 4,028,380.

Brunet, Henry, to Compagnie Generale d'Electricite. Vibration energy transfer laser. 4,028,635, Cl. 331-94.50G.

Brunswick Corporation: *See—*
Rauchle, Roy J.; and Vandenberg, John L., 4,027,555.

Bryans, Alexander Connor, to General Electric Company. Diffuser for a centrifugal compressor. 4,027,997, Cl. 415-207.000.

Bryant, Ronald K., to Branson Ultrasonics Corporation. Apparatus for embossing a plastic workpiece using vibratory energy. 4,028,033, Cl. 425-183.000.

Buchi, George H.; and Wuest, Hans, to Firmenich S.A. Cycloaliphatic unsaturated ketones as fragrance modifying agents. 4,028,278, Cl. 252-522.000.

Buckholtz, Theonda N., Jr. Novelty item. 4,027,874, Cl. 272-1.00R.

Buckley, David A.; and Belli, Frank G., to Xerox Corporation. Migration imaging member employing a surface skin. 4,028,101, Cl. 96-1.500.

Buckley, Norman Ian; and Wilson, Edward, to Shorrock Developments Limited. Intruder detection device. 4,028,690, Cl. 340-258.00B.

Bucyrus-Erie Company: *See—*
Johnston, Roger L.; and Wiencek, Daniel C., 4,027,801.

Bud, Hans; and Alway, Peter, to Bud, Hans. Counting devices. 4,028,530, Cl. 235-144.0HC.

Bueker, Robert A., to Direct Image Corporation. Sheet separation device. 4,027,872, Cl. 271-170.000.

Buffenbarger, John K.: *See—*
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Bujas, Roko, to Commissariat a l'Energie Atomique. Method and device for the fabrication of nuclear fuel compacts. 4,028,446, Cl. 264-.500.

Bullard, Robert G.; Plunkett, James P.; and Linning, George F., to Coils, Inc. Battery charger. 4,028,654, Cl. 336-92.000.

Bumgardner, Jon H. Optical frequency processor. 4,027,974, Cl. 356-74.000.

Bundy, Gordon L., to Upjohn Company, The. 9α,11αor 11α,9αEpoxymethano-prostaglandans and process for their preparation. 4,028,350, Cl. 260-240.00R.

Burdette, George W.; and Couch, Dean H., to United States of America, Navy. Low viscosity-high flash point ramjet and turbojet fuels. 4,028,066, Cl. 44-80.000.

Burge, William G. Theft-prevention screw fastenings. 4,027,572, Cl. 85-32.00R.

Burlington Industries, Inc.: *See—*
Sanderson, William A., 4,028,403.

Burpee, Louis W. Detachable windshield wiper assembly for helmet. 4,027,354, Cl. 15-250.300.

Burroughs Corporation: *See—*
Neri, Joseph Dominic; and Williams, John Lewis, 4,028,286.

Burton, Robert S., III: *See—*
Bartel, William J.; and Burton, Robert S., III, 4,027,917.

Buskine S.A.: *See—*
Taccone, Ida, 4,028,351.

Bustin, Leopold. Free flow grating. 4,027,451, Cl. 52-664.000.

Butcher, Alan George, to Dresser Europe S. A. Control valve. 4,027,694, Cl. 137-495.000.

Butler, James G.: *See—*
Butler, Robert M.; Butler, John T.; and Butler, James G., 4,027,628.

Butler, John T.: *See—*
Butler, Robert M.; Butler, John T.; and Butler, James G., 4,027,628.

Butler, Robert M.; Butler, John T.; and Butler, James G. Automatic feeding system for gestating livestock. 4,027,628, Cl. 119-52.00B.

Byrnes, Herbert P.; and Wahl, Richard, to International Business Machines Corporation. Contact for an electrical contactor assembly. 4,027,935, Cl. 339-48.000.

Byrum, Bernard W., Jr.; Fein, Michael E.; and Ernsthausen, Roger E., to Owens-Illinois, Inc. Gas discharge dielectric containing a source of boron, gallium, indium, or thallium. 4,028,578, Cl. 313-221.000.

C. Reichert Optische Werke AG: *See—*
Steinbatz, Alfred, 4,027,981.

C. Terrot Sohne, Firma: *See—*
Bitzer, Hans Eugen, 4,027,506.

Cabiro, Jorge Canals: *See—*
Jarque, Ricardo Granados; Cartes, Juan Bosch; Cabiro, Jorge Canals; Roldan, Cristobal Martinez; and Peinado, Rabadan, 4,028,371.

Cachier, Gerard; and Puron, Jean Paul, to Thomson-CSF. High-speed, low consumption integrated logic circuit. 4,028,556, Cl. 307-205.000.

Cadillac Rubber & Plastics, Inc.: *See—*
Dukes, Glenn V.; and Stroh, Thomas L., 4,027,813.

CAE Machinery Ltd.: *See—*
Weavell, Jack, 4,027,563.

Caldecott, Ross: *See—*
Young, Jonathan D.; and Caldecott, Ross, 4,028,707.

Camillucci, Edward R.: *See—*
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Campagnie des Brevets et Applications Industrielles Etablissement: *See—*
Romanin, Bruno, 4,027,704.

Campagnuolo, Carl J.; Smith, Earl T.; and Dale, Ronald L., to United States of America, Army. Multi-directional system for electrical bomb fuzes. 4,027,593, Cl. 102-70.20G.

Campbell, Robert W.: *See—*
Kleinschmidt, Roger F.; and Campbell, Robert W., 4,028,476.

Canadian Occidental Petroleum, Ltd.: *See—*
Geddes, Robert S.; Chalmers, William W.; and Williams, Ross R., 4,027,656.

Canadian Patents and Development Limited: *See—*
Heggie, William S., 4,027,536.
Zajic, James E.; and Volesky, Bohumil, 4,028,182.

Canay, Muzaffer, to BBC Brown Boveri & Company Limited. Synchronous motor structure incorporating rotor having solid poles. 4,028,574, Cl. 310-269.000.

Canon Kabushiki Kaisha: *See—*
Shigeta, Yoshihiro; Suzaki, Kuniyoshi; and Ogiso, Mitsutoshi, 4,027,958.

Canton Textile Mills, Inc.: *See—*
Llach, Lorenzo; and Picas, Arturo, 4,027,358.

Caplat, Sylvain, to Societe Les Coffrages Madernes. Panel for casting concrete. 4,027,846, Cl. 249-189.000.

Capuano, Italo A., to Olin Corporation. Method for monitoring available chlorine in swimming pools. 4,028,197, Cl. 204-1.00T.

Carena, Ugo: *See—*
Sargentini, Enrico; and Carena, Ugo, 4,027,766.

Carey, David R.; Goldstone, Bertram J.; and Thompson, Bernard J., to Raytheon Company. Pulse compression radar and method of operating such a radar. 4,028,700, Cl. 343-17.2PC.

Carl Hurth Maschinen- und Zahnradfabrik: *See—*
Eichinger, Johann; and Schwibach, Wilhelm, 4,027,553.

Carl Still, Firma: *See—*
Bender, Martin; Knappstein, Johannes; and Stratmann, Josef, 4,028,192.

Carlick, Daniel J.: *See—*
Rosen, George; Carlick, Daniel J.; and Reiter, Ralph H., 4,028,204.

Carlisle, Denis Richard, to Rolls-Royce (1971) Limited. Fuel burners. 4,028,044, Cl. 431-158.000.

Carlson, David H. J.; Verachtert, Thomas A.; and Sobel, Jay E., to UOP Inc. Process for the preparation of a solid bed catalyst system. 4,028,269, Cl. 252-428.000.

Carlsson, Tage; and Lampe, Wolfgang, to ASEA Aktiebolag. Electrical

equipment having radial cooling channels with means for guiding cooling fluid through the channels. 4,028,653, Cl. 336-60.000.
Carmel, Edwin L.: *See—*
Deller, Robert J.; and Carmel, Edwin L., 4,027,743.
Carnicelli, Ernest J.: *See—*
Miller, Wayne L.; and Carnicelli, Ernest J., 4,028,698.
Carpenter, Charles R., to Metallic Ladder Manufacturing Corporation. Transportable boat lift. 4,027,492, Cl. 61-65.000.
Carrier Corporation: *See—*
Streifert, Keith L., 4,027,931.
Carter, John L.; and McGowan, Joseph, to United States of America, Army. Power dividing and combining techniques for microwave amplifiers. 4,028,632, Cl. 330-53.000.
Cartes, Juan Bosch: *See—*
Jarque, Ricardo Granados; Cartes, Juan Bosch; Cabiro, Jorge Canals; Roldan, Cristobal Martinez; and Peinado, Rabadan, 4,028,371.
Casio Computer Co., Ltd.: *See—*
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Cassidy, Stephen; Baboian, Robert; Frechette, Raymond A.; Haynes, Gardner S.; and Ross, John W., to Texas Instruments Incorporated. Beryllium copper plating process. 4,028,064, Cl. 428-675.000.
Caterpillar Tractor Co.: *See—*
Hopkins, Donald L., 4,028,010.
Lipp, Charles E.; and Young, Teddy R., 4,027,471.
Ritchie, James A., 4,028,020.
Stepe, Visvaldis A., 4,027,409.
Cavagnero, Erman V.; and Patel, Ashok Z., to Torin Corporation. Propeller fan. 4,028,007, Cl. 416-212.00R.
Cavalla, John Frederick; and Archibald, John Leheup, to John Wyeth & Brother Limited. Benzamidopiperidine derivatives. 4,028,352, Cl. 260-240.00R.
Cavalla, John Frederick; and Archibald, John Leheup, to John Wyeth & Brother Limited. Benz[g]indolyl compounds. 4,028,365, Cl. 260-293.610.
Caywood, Howard E.: *See—*
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Cebalo, Tony, to Eli Lilly and Company. Herbicidal use of 5-cyanoalkyl-1,3,4-thiadiazol-2-ylureas. 4,028,090, Cl. 71-90.000.
Cedarleaf, Curtis E. Solution for electroless chrome alloy plating. 4,028,116, Cl. 106-1.000.
Celanese Corporation: *See—*
Hebert, Elie Loyd, 4,028,032.
Celotex Corporation, The: *See—*
Hipchen, Donald E.; Skowronski, Michael J.; and Hagan, Joseph R., 4,028,158.
Cengel, John A.: *See—*
Puskas, Imre; and Cengel, John A., 4,028,264.
Central Automobile Industry Co., Ltd., The: *See—*
Lauzier, Rene, 4,027,855.
Central Dynamics Ltd.: *See—*
Skrydstrup, Ole, 4,028,727.
Cessna Aircraft Company, The: *See—*
Miller, Wayne L.; and Carnicelli, Ernest J., 4,028,698.
Chachin, Viktor Nikolaevich; Zdor, Gennady Nikolaevich; Zhuravsky, Alexandr Julyanovich; Golovkina, Elena Yakovlevna; and Shaduya, Vladimir Leontievich. Device for electrical discharge forming. 4,027,515, Cl. 72-56.000.
Chadwick, Kenneth E.: *See—*
Chia, E. Henry; Powers, Frank M.; and Chadwick, Kenneth E., 4,028,141.
Chalmers, Alexander Michael; Jack, James; and Cook, Barry, to Ciba-Geigy Corporation. Piperidine derivatives. 4,028,334, Cl. 260-45.80N.
Chalmers, William W.: *See—*
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Champion International Corporation: *See—*
Norris, Alan H., 4,028,159.
Snow, John E., 4,028,537.
Thompson, Kenneth P., 4,028,551.
Chang, Hsu, to International Business Machines Corporation. Rewritable bubble domain decoder. 4,028,672, Cl. 340-174.0TF.
Chang, Pei K., to Stauffer Chemical Company. Removal of proteins from liquid acid cheese whey. 4,028,317, Cl. 260-112.00R.
Chant, Bernard J.: *See—*
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Chant, Peter R.: *See—*
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Chavanel, Hubert: *See—*
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Chavinie, Jacques: *See—*
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Chemetron Corporation: *See—*
Brown, Allen C.; Hattes, Neil R.; and Eyrick, Theodore B., 4,028,444.
Chemische Werke Huls Aktiengesellschaft: *See—*
Feldmann, Rainer; and Feinauer, Roland, 4,028,314.
Cheng, Bao-Ding, to Colgate-Palmolive Company. Citrate-carbonate built detergent. 4,028,262, Cl. 252-89.00R.
Cheng, Chin Huan; and Brubaker, Burton D., to Dow Chemical Company, The. Method of insulating cryogenic vessels. 4,027,379, Cl. 29-455.00R.
Cheng, King Y.: *See—*
Motley, David M.; and Cheng, King Y., 4,028,626.
Cherednichenko, Vladimir Semenovich; Orlov, Gennady Ivanovich; Mikulinsky, Aron Semenovich; Arzamastsev, Jury Semenovich; Efremkin, Vladimir Vasilievich; Nikitin, Valentin Alexeevich, deceased; by Nikitina, Valentina Kuzminichna, administrator; and by Nikitin, Dmitry Valentinovich, administrator. Apparatus for continuous vacuum-refining of metals. 4,027,861, Cl. 266-149.000.
Cherin, Allen Henry; and Rich, Philip Jay, to Bell Telephone Laboratories, Incorporated. Method of splicing pairs of arrayed or individual fibers utilizing optical fiber aligning grooves. 4,028,162, Cl. 156-158.000.
Cherny, Dmitry Grigorievich: *See—*
Shemonaev, Alexandr Tikhonovich; Cherny, Dmitry Grigorievich; Genis, Semen Naumovich; and Vishnitsky, Igor Konstantinovich, 4,027,438.
Chevron Research Company: *See—*
Stayner, Robert A.; and Lowe, Warren, 4,028,143.
Chia, E. Henry; Powers, Frank M.; and Chadwick, Kenneth E., to Southwire Company. Aluminum iron silicon alloy. 4,028,141, Cl. 148-2.000.
Chiba, Ko: *See—*
Takeuchi, Hiroshi; Ishizawa, Toshitugu; Yamano, Tetuyuki; Chiba, Ko; and Kobayashi, Daisaku, 4,028,022.
Chicago Commutator, Inc.: *See—*
Edstrom, Keith G.; and Edstrom, Gene K., 4,027,785.
Chihoski, Russell Alexander; and De Fellippie, John Charles, to Martin Marietta Corporation. Multi-mode structural weld monitor on a time base. 4,028,522, Cl. 219-109.000.
Chinnock, Edwin LeRoy: *See—*
Gloge, Detlef Christoph; Smith, Peter William; and Chinnock, Edwin LeRoy, 4,027,814.
Chiu, Tony T.; and Strasser, Jurgen H., to FMC Corporation. Pouch filling under air exclusion. 4,027,450, Cl. 53-112.00B.
Chlystun, Walter K. Blow molded container with nestable pouring spout with improved spout opening and withdrawal means. 4,027,811, Cl. 222-529.000.
Cho, Susumu; Erickson, Paul Milton; and Null, Michael William, to Motorola, Inc. Sample and hold valley detector. 4,028,627, Cl. 325-349.000.
Chono, Masazumi: *See—*
Doi, Tsunesuke; Komoto, Hiroshi; Chono, Masazumi; Inoue, Akira; Saito, Kazuaki; and Shinozuka, Isao, 4,028,055.
Christell, Adolf Ragnar Roland Umberto Einarsson; Koski, Kaijo Aatto Matias; and Ljunggren, Knut Lennart, to Stiftelsen Isotoptekniska Laboratoriet. Method and apparatus for measuring the concentration of a component, for instance iron, in a material. 4,028,267, Cl. 250-359.000.
Christopolous, John: *See—*
Mishcon, Lester; and Christopolous, John, 4,027,505.
Chrysler Corporation: *See—*
Latva, Henry F., 4,028,100.
Chu, Joseph Y. C.; and Gunther, W. H. H., to Xerox Corporation. Process for preparation of solid phase dispersion of photoconductive material. 4,028,203, Cl. 204-158.00R.
Chuang, Ping-Chien, to Recognition Equipment Incorporated. Automated signature verification system. 4,028,674, Cl. 340-146.3SY.
Chyung, Kenneth, to Corning Glass Works. Lead feldspar glass-ceramic bodies. 4,028,121, Cl. 106-39.800.
Ciba-Geigy AG: *See—*
Hegar, Gert; and Angliker, Hans-Joerg, 4,028,323.
Ciba-Geigy Corporation: *See—*
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Cimiluca, Arthur: *See—*
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Circon Corporation: *See—*
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Cities Service Company: *See—*
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Claeson, Karl Goran: *See—*
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Clark Equipment Company: *See—*
Tymciurak, Bohdan, 4,027,448.
Wolfe, Robert W., 4,027,756.
Clark, James L.; and Mather, Byron L., to Plastronics, Inc. Plastic container and closure collar combination and method. 4,028,156, Cl. 156-69.000.

Clark, Judith Ann, to Beecham Group Limited. Diphenylpropylamines. 4,028,415, Cl. 260-570.00R.

Clarke, Robert L.: *See—*
Daum, Sol J.; and Clarke, Robert L., 4,028,188.

Clavin, Edward A., to Midcon Pipeline Equipment Co. Internal mandrel for use in bending the ends of pipes. 4,027,522, Cl. 72-466.000.

Clavin, Edward Albert, to Midcon Pipeline Equipment Co. Apparatus for brush-cleaning the interiors of pipes. 4,027,349, Cl. 15-104.120.

Clay Bernard Systems International Ltd.: *See—*
Bernard, Clay, II; Matheny, William F., III; and Parker, Billy J., 4,027,833.

Cleland, Charles E., to Continental Machines, Inc. Replaceable surface band wheel. 4,027,568, Cl. 83-788.000.

Clough, Thomas J., to Atlantic Richfield Company. Process, products and composition. 4,028,414, Cl. 260-566.00R.

Coal Industry (Patents) Limited: *See—*
Urquhart, Donald Bremner, 4,028,220.

Coburn, Michael D., to United States of America, Energy Research and Development Administration. Ammonium 2,4,5-trinitroimidazole. 4,028,154, Cl. 149-92.000.

Coburn Optical Industries, Inc.: *See—*
Haddock, Fred A., 4,027,434.

Cocks, Eric H. Reversing means for double-acting fluid pump. 4,028,014, Cl. 417-403.000.

Coils, Inc.: *See—*
Bullard, Robert G.; Plunkett, James P.; and Linning, George F., 4,028,654.

Colasanti, Arduino: *See—*
Stephenson, Robert Larry; and Colasanti, Arduino, 4,027,829.

Cole, Gerald S.; Kovacs, Bela V.; Sensoli, Robert A.; and Smartt, Herschel B., to Ford Motor Company. Continuous stream - inclined trough treatment of ductile iron. 4,028,099, Cl. 75-130.00B.

Cole, Oliver W.: *See—*
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Colgate-Palmolive Company: *See—*
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Gray, Frederick William, 4,028,263.
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Colgate, Stirling A. Nuclear reactor core safety device. 4,028,179, Cl. 176-38.000.

Collet, Marnix Guillaume: *See—*
van Santen, Johannes Gerrit; and Collet, Marnix Guillaume, 4,028,716.

Colletti, Vincent, to United States of America, Navy. Plug-type counterweight and lock. 4,027,549, Cl. 74-573.00R.

Collier, Paul Arthur, to Rellico Engineering Limited. Conveyor chain assemblies having scraper bars attached at intervals to a chain or chains. 4,027,770, Cl. 198-728.000.

Collins, Robert Henry; Levine, Richard F.; North, William D.; O'Rourke, Gerald D.; and Parker, Gerald R., to International Business Machines Corporation. Method for making reliable MOSFET device. 4,028,150, Cl. 148-187.000.

Collura, Frank. Solar energy collector. 4,027,652, Cl. 126-271.000.

Colombo, Piero. Rocking device for continuous casting molds. 4,027,724, Cl. 164-260.000.

Colone, Anthony S. Method for implanting hair. 4,027,675, Cl. 128-330.000.

Combs, Glen: *See—*
Monsky, Jeffrey N.; and Combs, Glen, 4,027,437.

Commissariat a l'Energie Atomique: *See—*
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Failla, Henri; Schaller, Karl; and Vidard, Michel, 4,028,177.
Jullien, Rene; Perona, Maurice; and Venot, Robert, 4,028,178.

Commonwealth Scientific and Industrial Research Organization: *See—*
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Compagnie Generale d'Electricite: *See—*
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Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie: *See—*
Verdier, Henri, 4,027,712.

Connolly, Thomas M.; and Luoma, Eino J., to United States of America, Army. Microwave absorbers. 4,027,384, Cl. 29-592.000.

Consumers Glass Company Limited: *See—*
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Container Corporation of America: *See—*
Maskell, Richard N., 4,027,707.

Conti, Armand R. Hydraulic powered lubricator and sprayer. 4,028,473, Cl. 427-434.00E.

Continental Can Company, Inc.: *See—*
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Pan, Peter N. Y.; and Hernandez, Rafael J., 4,027,607.

Continental Machines, Inc.: *See—*
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Continental Oil Company: *See—*
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Cook, Barry: *See—*
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Cook, Boyd Stanley: *See—*
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Cook, Glenn M.: *See—*
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Cook, Peter William; and Schuster, Stanley E., to International Business Machines Corporation. A/D and D/A converter using C-2C ladder network. 4,028,694, Cl. 340-347.0AD.

Coordination et Developpement de l'Innovation Societe Anonyme en abrege Cordi: *See—*
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Coors Container Company: *See—*
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Copal Company Limited: *See—*
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Yaguinuma, Jusuke, 4,027,550.

Copolymer Rubber & Chemical Corporation: *See—*
Bond, William C., Jr.; and Wahlborg, Harold J., 4,028,483.

Cord'homme, Edmond, to Thomson-CSF. Inverters supplying a high frequency alternating current. 4,028,610, Cl. 321-14.000.

Core-Lube, Inc.: *See—*
Schaidle, William J.; and Stewart, Patrick H., 4,028,271.

Corneliusen, Philip R.: *See—*
Mead, George N. J.; and Corneliusen, Philip R., 4,027,355.

Corning Glass Works: *See—*
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Corporacion de Fomento de la Produccion, represented by Comite de Investigaciones Technologicas: *See—*
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Corwin, Richard R.: *See—*
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Cory, John S. Variable density heat engine. 4,027,479, Cl. 60-527.000.

Cosden Oil & Chemical Company: *See—*
Hahn, Granville J., 4,028,034.

Cosset, Andre: *See—*
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Cote, Leopold J. Rubbish container. 4,027,774, Cl. 220-63.00R.

Cottin, Jean; and Laxague, Jean, to Thomson-CSF. System for displaying information aboard a moving object. 4,028,531, Cl. 236-150.200.

Cotton, Louis S.: *See—*
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Cotts, Ronald F.: *See—*
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Couch, Dean H.: *See—*
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Jourdan, Francis; Couderc, Georges; and Ediar, Serge, 4,028,544.

Coulter Information Systems, Inc.: *See—*
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Covert, John S. Primer feed cartridge. 4,027,781, Cl. 221-105.000.

Covington, Wayne F.: *See—*
Olander, Emil Edward, Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,028,538.

Coxhill, Major, to Allis-Chalmers Corporation. Gyratory crusher eccentric assembly removal system. 4,027,825, Cl. 241-213.000.

Crain, Philip Warren: *See—*
Kilroy, Eugene Joseph, Jr.; Crain, Philip Warren; and Woods, James Frank, 4,027,424.

Cramer, Richard David, to Du Pont de Nemours, E. I., and Company. Preparation of high trans-isomer content 1,4-dienes. 4,028,429, Cl. 260-680.00R.

Creecy, Michael Earl: *See—*
Rogers, Jimmy Dale; and Creecy, Michael Earl, 4,028,633.

Creel, Theodore R., Jr.: *See—*
United States of America, National Aeronautics and Space Administration; Creel, Theodore R., Jr.; Jones, Robert A.; Corwin, Richard R.; and Kramer, Joseph S., 4,027,524.

Crepinsek, Alois, to International Top Security Corporation. Security chain lock for doors. 4,027,907, Cl. 292-264.000.

Crepinsek, Alois, to International Top Security Corporation. Safety chain lock for doors. 4,027,908, Cl. 292-264.000.

Cribbs, Roland F. Boat anchor. 4,027,615, Cl. 114-311.000.

Cronan, Charles J.: *See—*
LaBelle, Harold E., Jr.; and Cronan, Charles J., 4,028,059.

Cronin, John A.: *See—*
Fountain, Gerald F.; Veloz, Jaime; Bilson, Edward A.; and Cronin, John A., 4,028,235.

Crounse, Nathan N.; and Ambrosiano, Nicholas A., to Sterling Drug Inc. Metal chelates of 1-imino-3-(4-thioxo-5-thiazolidinylidene)isoindolines. 4,028,372, Cl. 260-299.000.

Crounse, Nathan Norman, to Sterling Drug Inc. 2'-(4,6-Disubstituted)-s-triazin-2-yl)amino-6'-dialkylamino flurans. 4,028,357, Cl. 260-249.500.

Crown Controls Corporation: *See—*
Dicke, Paul A., 4,028,571.

Crown Recreation, Inc.: *See—*
Dadbeh, Bemanali H., 4,027,878.

Crump, Leslie L.; and Italiano, Victor J., to NCR Corporation. Record media drive mechanism. 4,027,765, Cl. 197-133.00R.

Cummins Engine Company, Inc.: *See—*
Timour, Sune E., 4,027,644.

Cummins, James M., to Mirrex, Incorporated. Remote control mirror. 4,027,548, Cl. 74-501.00M.

Cunningham, Ashley D. Static mixer for flowable materials, and related method. 4,027,857, Cl. 259-4.0AB.

Cunningham, Frank M.: *See—*
Murauskas, Donald J.; Kish, Edward E., Jr.; Cunningham, Frank M.; Gallagher, Bernard J.; and Shufflebarger, Earl D., 4,028,248.

Cunningham, Hugh, Jr. Puncture detecting device. 4,027,618, Cl. 116-114.00G.

Cunningham, Marion L.: *See—*
McClure, George F.; Endicott, John Richard; Freeman, Lionel D.; Cunningham, Marion L.; and Wells, Joel D., 4,028,500.

Curtis, Orlie L., to Northrop Corporation. Array type charge extraction device for infra-red detection. 4,028,719, Cl. 357-30.000.

Curtiss-Wright Corporation: *See—*
Berkowitz, Murray, 4,028,021.

Cushing, Donald S., to General Electric Company. Sealing means for a dishwasher tub and motor assembly. 4,028,012, Cl. 417-360.000.

Cutter Laboratories, Inc.: *See—*
Thompson, John A.; and Torres, Robert V., 4,027,577.

CX Corporation: *See—*
Edwards, Gerald L., 4,028,619.

Dadbeh, Bemanali H., to Crown Recreation, Inc. Bed leveling mechanism. 4,027,878, Cl. 273-6.000.

Daghofer, Otto: *See—*
Plockinger, Erwin; Daghofer, Otto; and Barakat, Farouk, 4,027,720.

Daikin Kogyo Co., Ltd.: *See—*
Futami, Takashi; Tatsukami, Yoshiharu; Takamoto, Toyoji; Oda, Yasuhiro; and Tomoda, Masayasu, 4,028,431.

Dale, James A.; and Leonard, William J., to Dynapol Corporation. Polymeric phenolic antioxidants. 4,028,342, Cl. 260-47.0UA.

Dale, Ronald L.: *See—*
Campagnuolo, Carl J.; Smith, Earl T.; and Dale, Ronald L., 4,027,593.

Daly, Edwin A., to Walcon Corporation. Explosion venting wall structure with releasable fastener means. 4,027,436, Cl. 52-1.000.

Damon, Billy L.: *See—*
Kieffer, Vernon E.; and Damon, Billy L., 4,028,570.

Damron, William M. Archery bow with arrow guiding device. 4,027,645, Cl. 124-24.00R.

Dart Industries Inc.: *See—*
Allan, John L., 4,028,238.
Wallding, Wayne A.; and Arrandale, Roy S., 4,027,426.

Date, Masakazu: *See—*
Wada, Masahiro; and Date, Masakazu, 4,027,346.

Daum, Sol J.; and Clarke, Robert L., to Sterling Drug Inc. Aminocyclitol antibiotics. 4,028,188, Cl. 195-96.000.

Davenport Machine Tool: *See—*
Brinkman, Earl W., 4,027,376.

Davey, Roger George, to Domtar Limited. Consolidation of dry formed webs. 4,028,457, Cl. 264-120.000.

Davich, Theodore B.: *See—*
McKibben, Gerald H.; and Davich, Theodore B., 4,027,420.

David, Klaus: *See—*
Stade, Heinrich; and David, Klaus, 4,027,490.

Davidovits, Joseph; and Legrand, Jean Jacques, to Coordination et Developpement de l'Innovation Societe Anonyme en abrege Cordi. Process for agglomerating compressible mineral substances under the form of powder, particles or fibres. 4,028,454, Cl. 264-82.000.

Davies, Donald W., to Andros Incorporated. Gas analyzer method and apparatus. 4,027,972, Cl. 356-51.000.

Davis, Kenneth L., to United States of America, Navy. Semiconductor visible image storage device. 4,028,565, Cl. 307-311.000.

Davis, Raymond R.; Langberg, Alfred M.; and Debus, Alvin P., to Hungerford & Terry, Inc. Apparatus for and method of recovering water used to backwash and rinse a filter. 4,028,241, Cl. 210-60.000.

Davis, Robert Elliott: *See—*
Baldwin, Roger Allen; and Davis, Robert Elliott, 4,028,219.

Dawans, Francois; and Durand, Jean-Pierre, to Institut Francais du Petrole. Process for manufacturing flexible epoxide resins. 4,028,432, Cl. 260-836.000.

Dawes, Dag: *See—*
Meyer, Willy; Bohner, Beat; Dawes, Dag; and Rufenacht, Kurt, 4,028,377.

Dawson, Chester H., to Remington Arms Company, Inc. Method and machine for locating variations in tension in a saw blade. 4,027,531, Cl. 73-100.000.

Dawson, David H., to Dow Chemical Company, The. Tube treating and apparatus therefor. 4,028,037, Cl. 425-392.000.

Dayco Corporation: *See—*
White, Jack D., Jr., 4,027,545.

Deal, Bruce E.; and Hu, Daniel C., to Fairchild Camera and Instrument Corporation. Complementary insulated gate field effect transistor structure and process for fabricating the structure. 4,027,380, Cl. 29-571.000.

Debus, Alvin P.: *See—*
Davis, Raymond R.; Langberg, Alfred M.; and Debus, Alvin P., 4,028,241.

De Fellippie, John Charles: *See—*
Chihoski, Russell Alexander; and De Fellippie, John Charles, 4,028,522.

Deines, John L.; Ku, San-Mei; Poponiak, Michael R.; and Tsang, Paul J., to International Business Machines Corporation. Process for forming monocrystalline silicon carbide on silicon substrates. 4,028,149, Cl. 148-175.000.

Deja, Edmund P.: *See—*
Snyder, Robert P.; and Deja, Edmund P., 4,027,538.

Delaney, Michael J.; and Gilbert, Hiram G., to Raymond Corporation, The. Motor control systems. 4,028,597, Cl. 318-87.000.

Dell, Christopher Cambridge, to National Research Development Corporation. Froth flotation. 4,028,229, Cl. 209-164.000.

Deller, Robert J.; and Carmel, Edwin L., to Pullman Incorporated. Axle end oil fill and leakage detector method of charging lubricant. 4,027,743, Cl. 184-6.400.

Deloney, Hugh C.: *See—*
Smith, Randlow; Jones, Henry B.; Jobsis, Adrianus C.; and Deloney, Hugh C., 4,028,139.

De Long, Carol. Serving container for hot liquids. 4,027,779, Cl. 220-23.830.

Demag Aktiengesellschaft: *See—*
Elsner, Wolfgang; Moslener, Jorn; and Langenstuck, Alfons, 4,027,565.

De Marco, Nicholas. Safety cigarette holder and ash retaining device. 4,027,680, Cl. 131-175.000.

Demase, John P., to United Technologies Corporation. Fuel prefill and distributor valve construction. 4,027,474, Cl. 60-39.28R.

De Ment, Robert B.; and Simms, William D., to Kastalon Inc. Sealing device for can testing machines. 4,027,513, Cl. 73-49.800.

Demoute, Jean-Pierre: *See—*
Hainaut, Daniel; and Demoute, Jean-Pierre, 4,028,386.

Deneen, William. Agitator for solids-containing vessels. 4,028,251, Cl. 210-280.000.

Dennie, Richard H.: *See—*
Kane, Thomas J.; and Dennie, Richard H., 4,027,621.

DePree, David O.: *See—*
Katzakian, Arthur, Jr.; and DePree, David O., 4,028,234.

de Putter, Warner Jan, to Wavin B.V. Removal of injection moulded products. 4,028,039, Cl. 425-436.00R.

Deritend Engineering Company Limited, The: *See—*
Bishop, Thomas Desmond, 4,027,873.

Derrick, Danny O., to Shakespeare Company. Locking hinge mechanism for a stepladder. 4,027,741, Cl. 182-22.000.

De Silva, Wijitha: *See—*
Bocion, Pierre; De Silva, Wijitha; and Winternitz, Pavol, 4,028,089.

Desio, Frank B.; and Webb, Samuel Lee, to Illinois Tool Works Inc. Spring contact switch for dual in line multiple switch assembly having momentary actuated lighted indicators. 4,028,515, Cl. 200-276.000.

DeSousa, Peter. Pet elevator. 4,027,626, Cl. 119-15.000.

Detering, Richard L., to Westinghouse Electric Corporation. Digital firing pulse generator with pulse suppression. 4,028,609, Cl. 321-5.000.

Dettmer, Edward V., to Dow Chemical Company, The. Apparatus for mixing. 4,027,858, Cl. 259-4.00R.

Deubel, Bernard S., to Therm-O-Disc Incorporated. Method of manufacturing sealed thermostats. 4,027,385, Cl. 29-622.000.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Asinger, Friedrich; Offermanns, Heribert; and Gluzek, Karl-Heinz, 4,028,406.

Deutsche Vergaser GmbH & Co Kommanditgesellschaft: *See—*
Mundil, Waldemar Dietmar, 4,027,848.

De Weese, Raymond Paul; and Kumpfer, Beverly D., to Roper Corporation. Modular power supply and waveguide construction for microwave oven. 4,028,519, Cl. 219-10.55B.

Dey, Arabinda N., to P. R. Mallory & Co. Inc. Method of construction of an ultraminiature high energy density cell. 4,028,138, Cl. 29-623.200.

Diamond Shamrock Corporation: *See—*
Lewis, David L.; Franks, C. Richard; and Schenker, Barry A., 4,028,215.
Magee, Thomas A., 4,028,413.

Dicke, Paul A., to Crown Controls Corporation. Control mechanism for remotely mounted motor. 4,028,571, Cl. 310-89.000.

Dickey, Clarence A., to Glasrock Products, Inc. Foaming device for high solids content foamable liquids. 4,027,789, Cl. 222-190.000.

Diehl, George D.: *See—*
Shufflebarger, Earl D.; Kish, Edward E.; Boylan, John R.; Diehl, George D.; Gallagher, Bernard J.; and Tobbe, William P., 4,028,254.

Diesel Kiki Co., Ltd.: *See—*
Utsugi, Kazuo, 4,027,500.

Diesner, Ferdinand, to Jakob Muller, Forschungs-und Finanz AG. Shuttleless weaving machine, especially ribbon loom. 4,027,703, Cl. 139-431.000.

Dietschy, Robert; and Hexel, Georges. Stitch presser for knitting machine. 4,027,504, Cl. 66-64.000.

Dikman, Robert J. Paper thrower. 4,027,780, Cl. 221-7.000.

Direct Image Corporation: *See—*
Bueker, Robert A., 4,027,872.

Director-General of the Agency of Industrial Science and Technology: *See*—
Okada, Akira; Iriyama, Keiji; and Shiraki, Masaru, 4,028,217.

Dischinger, Gebhard, to Babolat-Maillot-Witt; and Lipa Lizenz-und Patentverwertungs-ansalt. Device for the insertion of an intermediate member between two crossing strings of a tennis racquet. 4,027,371, Cl. 29-811.000.

Divine, Charles Hamman, to Bell Telephone Laboratories, Incorporated. Memory patching circuit with increased capability. 4,028,679, Cl. 340-172.500.

Divine, Charles Hamman; and O'Neill, John Francis, to Bell Telephone Laboratories, Incorporated. Memory patching circuit with counter. 4,028,683, Cl. 340-172.500.

Divine, Charles Hamman; and Moran, John Christian, to Bell Telephone Laboratories, Incorporated. Memory patching circuit with repatching capability. 4,028,684, Cl. 340-172.500.

Di Vita, Sam; and Vig, John R., to United States of America, Army. Method of treating optical waveguide fibers. 4,028,080, Cl. 65-2.000.

Dixon, Guy E.; Dixon, Thomas M.; and Geyer, Russell I., Jr., to Panelfold Doors, Inc. Hinge strip for dual wall accordion folding door. 4,027,714, Cl. 160-84.00R.

Dixon, Thomas M.: *See*—
Dixon, Guy E.; Dixon, Thomas M.; and Geyer, Russell I., Jr., 4,027,714.

Dockus, Kostas F., to Borg-Warner Corporation. Plating baths for depositing cobalt-lead nickel-lead alloys or combinations thereof and method of coating aluminum articles therewith. 4,028,200, Cl. 204-43.00T.

Dr. Kuhn & Co. GmbH: *See*—
Sickel, Helmut, deceased, 4,028,492.

Dr. Th. Wieland, Firma: *See*—
Strunz, Alfred; and Rohrer, Jurgen, 4,028,047.

Dodds, Andrew D.: *See*—
Krofchalk, Gary F.; and Dodds, Andrew D., 4,027,889.

Doi, Hachiro: *See*—
Takahashi, Katsuhiko; and Doi, Hachiro, 4,027,463.

Doi, Tsunesuke; Komoto, Hiroshi; Chono, Masazumi; Inoue, Akira; Saito, Kazuaki; and Shinozuka, Isao, to Asahi Kasei Kogyo Kabushiki Kaisha. Anti-corrosive agent for metals. 4,028,055, Cl. 21-2.70R.

Dolan, Thomas Albert, to Du Pont de Nemours, E. I., and Company. Yarn support. 4,027,830, Cl. 242-118.320.

Dolle, Alvin J. Security lock for trunk mounted antenna. 4,028,706, Cl. 343-715.000.

Domer, Michel: *See*—
Hauraux, Pierre; and Domer, Michel, 4,027,909.

Domic, Esteban; Sfeir, Albert; and Sandoval, Jorge, to Corporacion de Fomento de la Produccion, represented by Comite de Investigaciones Technologicas. Method of extraction involving the use of solvents and new combination of reactors used. 4,028,462, Cl. 423-24.000.

Domtar Limited: *See*—
Davey, Roger George, 4,028,457.

Donnell, James W. Extruded interior molding. 4,027,452, Cl. 52-716.000.

Dorsey, Geoffrey A., Jr., to Kaiser Aluminum & Chemical Corporation. Surface treatment of aluminum. 4,028,205, Cl. 204-181.000.

Dougherty, Earle T. Adjustably submersible breakwater. 4,027,486, Cl. 61-5.000.

Dougherty, Lawrence W., to Zenith Radio Corporation. Shadow mask mount and funnel-faceplate referencing system for color CRT. 4,028,580, Cl. 313-406.000.

Douglas, David, to Avon Products, Inc. Recloseable container. 4,027,776, Cl. 220-281.000.

Dow Chemical Company, The: *See*—
Ball, Clifford L.; and Smith, Harry A., 4,028,312.
Cheng, Chin Huan; and Brubaker, Burton D., 4,027,379.
Dawson, David H., 4,028,037.
Dettmer, Edward V., 4,027,858.
Gulbenk, Alin H., 4,028,092.
Kroposki, Lorraine M.; Yoshimine, Masao; and Freedman, Harold H., 4,028,439.
Martin, Robert C., 4,028,125.
Olstowski, Franciszek, 4,028,296.
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Olstowski, Franciszek, 4,028,304.
Thompson, James L., 4,028,257.
Treat, Lyle G., 4,027,512.

Dowdle, James B., Jr., to United States of America, Army. Three phase spin motor power meter. 4,028,623, Cl. 324-142.000.

Dowty Meco Limited: *See*—
Lampl, Friedrich; and Paul, Thomas Campbell, 4,027,793.

Dowty Mining Equipment Limited: *See*—
Walker, John Hirst; Sutton, James Anthony; and Waters, John Henry, 4,027,489.

Draber, Wilfried: *See*—
Kramer, Wolfgang; Draber, Wilfried; Timmler, Helmut; and Forster, Heinz, 4,028,409.

Dragerwerk Aktiengesellschaft: *See*—
Hickmann, Karl; and Sahmkow, Dieter, 4,028,445.

Dresser Europe S. A.: *See*—
Butcher, Alan George, 4,027,694.

Driscoll, Gary L., to Sun Ventures, Inc. Additives to improve wettability of synthetic paper pulp. 4,028,452, Cl. 264-51.000.

Drudge, Forrest R. Force absorbing hitch for a vehicle. 4,027,893, Cl. 280-487.000.

Duckworth, Milton Donald, Jr. Aircraft lavatory drain plug. 4,027,701, Cl. 137-800.000.

Duke, Jimmy R.: *See*—
Miller, Walter E., Jr.; and Duke, Jimmy R., 4,027,837.

Duke, Marshall W., to United Merchants and Manufacturers, Inc. Fire retardant fabrics and method for preparation thereof. 4,028,053, Cl. 8-116.00P.

Dukes, Glenn V.; and Stroh, Thomas L., to Cadillac Rubber & Plastics, Inc. Tube separator. 4,027,813, Cl. 225-97.000.

Dumoulin, Jean; and Nicou, Parasko, to Rhone-Poulenc Industries. Organosilicon compositions particularly suitable for the non-stick, rub-resistant treatment of cellulosic and synthetic materials. 4,028,298, Cl. 260-29.1SB.

Dunlop Limited: *See*—
Goodfellow, Anthony Gerald; and Rand, Maurice, 4,028,042.
Kenney, Michael John, 4,027,713.

Dunn, Allan R. Multi-angle U-shaped hub for infusion member. 4,027,668, Cl. 128-214.00R.

Dunn, Maurice J.: *See*—
Kolman, Philip; Dunn, Maurice J.; and Tiersten, David, 4,027,971.

Du Pont de Nemours, E. I., and Company: *See*—
Cramer, Richard David, 4,028,429.
Dolan, Thomas Albert, 4,027,830.
Fang, James C., 4,028,309.
Hannover, Finn, 4,027,903.
Harden, John Charles; and Mastrangelo, Sebastian V. R., 4,028,276.
Livingston, Richard Donnan; and Sauerbrunn, Robert Dewey, 4,028,443.
Moore, Earl Phillip, Jr., 4,028,345.
Tynan, Daniel Gregory, 4,028,302.
Weiss, James Paul; and Smith, Edward Dyal, 4,028,550.

Durand, Jean-Pierre: *See*—
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Duranleau, Roger G.; and Larkin, John M., to Texaco Inc. Preparation of acids. 4,028,388, Cl. 260-413.000.

Durno, Ronald Arthur, to United Technologies Corporation. Analog mixer to vary helicopter rotor phase angle in flight. 4,027,999, Cl. 416-40.000.

Dynamit Nobel Aktiengesellschaft: *See*—
Amort, Jurgen; and Nestler, Heinz, 4,028,343.
Hubsch, Gunter; Bendler, Hellmut; Stahlmann, Rudolf; and Gawlick, Heinz, 4,027,592.
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Dynapol Corporation: *See*—
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E. R. Squibb & Sons, Inc.: *See*—
Bodanszky, Miklos; and Sheehan, John Timothy, 4,028,315.
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East/West Industries, Inc.: *See*—
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Eastman Kodak Company: *See*—
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Hannie, David Eugene, 4,028,103.
Lamberts, Robert L.; and Nail, Nelson R., 4,028,109.
Sturmer, David M., 4,028,113.

Eberle, William J., to General Battery Corporation. Automatic air leak testing apparatus and method. 4,027,797, Cl. 209-74.00R.

Eck, Bruno. Impeller blade reinforcement. 4,028,005, Cl. 416-186.00R.

Eckert, John S. Tower support plate. 4,028,442, Cl. 261-94.000.

Ediar, Serge: *See*—
Jourdan, Francis; Couderc, Georges; and Ediar, Serge, 4,028,544.

Edstrom, Gene K.: *See*—
Edstrom, Keith G.; and Edstrom, Gene K., 4,027,785.

Edstrom, Keith G.; and Edstrom, Gene K., to Chicago Commutator, Inc. Dual pump colorant dispenser. 4,027,785, Cl. 222-135.000.

Edwards Engineering Corporation: *See*—
Edwards, Ray C., 4,027,495.

Edwards, Gerald L., to CX Corporation. Position locating using digital logic controlled by pulse propagation time intervals. 4,028,619, Cl. 324-34.0PS.

Edwards, Harrison F., to Bennett-Ireland, Inc. Fireplace enclosure. 4,027,650, Cl. 126-140.000.

Edwards, Ray C., to Edwards Engineering Corporation. Vapor recovery system for volatile liquids and vapor condensing apparatus for use therein. 4,027,495, Cl. 62-54.000.

Edwin Cooper & Company Limited: *See*—
Moat, Nicholas Warrington, 4,028,117.

Efremkin, Vladimir Vasilievich: *See*—
Cherednichenko, Vladimir Semenovich; Orlov, Gennady Ivanovich; Mikulinsky, Aron Semenovich; Arzamastsev, Jury Semenovich; Efremkin, Vladimir Vasilievich; Nikitin, Valentin Alexeevich, deceased; Nikitina, Valentina Kuzminichna, administrator; and Nikitin, Dmitry Valentinovich, administrator, 4,027,861.

Eggenberger, John Scott; and Voegeli, Otto, to International Business Machines Corporation. Field access propagation of bubble lattice. 4,028,685, Cl. 340-174.0TF.

Eichholz, Werner; and Krebs, Gerd, to Phoenix Gummiwerke AG. Winding drum for producing belt inserts for pneumatic tires. 4,028,169, Cl. 156-416.000.

Eichinger, Johann; and Schwibach, Wilhelm, to Carl Hurth Maschinen-

und Zahnradfabrik. Angle gear drive arrangement. 4,027,553, Cl. 74-801.000.
Eisenberger, Peter Michael, to Bell Telephone Laboratories, Incorporated. X-ray photolithography. 4,028,547, Cl. 250-272.000.
Eisenhardt, Fred W.; and Tonsfeldt, Wayne S. Weed pulling machine. 4,027,733, Cl. 171-58.000.
Eldridge, Robert James: *See—*
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Electro Corporation: *See—*
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Electronic Engineering Company of California: *See—*
Huntress, Charles B.; and Gabrielian, Henry, 4,028,491.
Elghani, Salah Elabd: *See—*
Prinz, Richard; Elghani, Salah Elabd; Fischer, Winfried; and Alberts, Heinrich, 4,028,433.
Eli Lilly and Company: *See—*
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Ellbrunner, Adalbert; Priewasser, Georg; Georg, Friedrich; and Stock, Horst, to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH. Process for the quantitative removal of residual melts from crucibles. 4,028,137, Cl. 134-8.000.
Ellenberger & Poensgen GmbH: *See—*
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Ellerbrock, Francis J.: *See—*
Felty, John T.; and Ellerbrock, Francis J., 4,027,468.
Ellis, Franklin H.; and Andrews, Stephen W., to Sybron Corporation. Method of in vivo sterilization of surgical implantables. 4,027,393, Cl. 32-10.00A.
Ellison Company, Inc., The: *See—*
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Elsner, Wolfgang; Moslener, Jorn; and Langenstuck, Alfons, to Demag Aktiengesellschaft. Revolving shears for high speed severing. 4,027,565, Cl. 83-337.000.
Emerson Electric Co.: *See—*
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EMI Limited: *See—*
Hounsfield, Godfrey Newbold, 4,028,554.
Emmons, Stephen P., to Texas Instruments Incorporated. Use of floating diffusion for low-noise electrical inputs in CCD's. 4,028,715, Cl. 357-24.000.
Emond, Robert Earl, to Exxon Research and Engineering Company. Mold release agent for urethane foamed rubber. 4,028,120, Cl. 106-38.240.
Endicott, John Richard: *See—*
McClure, George F.; Endicott, John Richard; Freeman, Lionel D.; Cunningham, Marion L.; and Wells, Joel D., 4,028,500.
Endo, Hajime: *See—*
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Endo, Shigeru: *See—*
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Endo, Takaya: *See—*
Hori, Haruo; Kikuchi, Shoji; Wada, Hajime; Kobayasi, Sadatosi; and Endo, Takaya, 4,028,106.
Engalitcheff, John, Jr., to Baltimore Aircoil Company, Inc. Method and apparatus of multi stage injector cooling. 4,028,440, Cl. 261-23.00R.
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Isaac, Peter A. H.; and Oulton, T. Dixon, 4,028,133.
Engineering & Research Associates, Inc.: *See—*
Floyd, Johnnie E., 4,027,735.
Engler, Edward M.; and Patel, Vishnubhai V., to International Business Machines Corporation. Tetraselenofulvalene, dithiodiselenofulvalene and the TCNQ salts thereof. 4,028,346, Cl. 260-239.00R.
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Madland, Robert Christen; Zielinski, Robert Michael, Jr.; and Engstrom, Keith Allen, 4,028,696.
Enomoto, Satoru; Takita, Hitoshi; Wada, Hisayuki; Mukaida, Yutaka; and Yanaka, Mikiro, to Kureha Kagaku Kogyo Kabushiki Kaisha. (1-Methyl-2-vinyl)4,6-heptadienyl-3,8-nonadienoate and a method of manufacturing the same. 4,028,387, Cl. 260-410.90N.
Epstein, Marvin Aaron, to International Telephone and Telegraph Corporation. MSK digital data synchronization detector. 4,028,490, Cl. 178-88.000.
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Erickson, David R., to Swift and Company Limited. Fluid removal in food processing, method and apparatus. 4,027,400, Cl. 34-17.000.
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Erickson, Terry D.: *See—*
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Esquire, Inc.: *See—*
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Ethicon, Inc.: *See—*
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Euler, Reinhold, to Hoechst Aktiengesellschaft. Apparatus for connecting a moving photoconductive web with a fixed electric potential. 4,027,967, Cl. 355-16.000.
European Plastic Machinery Mfg. A/S: *See—*
Holmberg, Leif, 4,028,244.
Evans, Gary E., to Westinghouse Electric Corporation. Apparatus for steering a rectangular array of elements by an angular increment in one of the orthogonal array directions. 4,028,710, Cl. 343-854.000.
Evans, James Gifford; and Haynie, Gerald Demarest, to Bell Telephone Laboratories, Incorporated. Selective intermodulation distortion measurement. 4,028,622, Cl. 324-57.00N.
Evans, Kenneth W.; Howlett, Mason M.; and Kirkpatrick, David H., to Gleason Works, The. Apparatus and method for reducing drag between clutch or brake components immersed in a liquid. 4,027,755, Cl. 192-18.00A.
Everett, George. Solar prominence adapter. 4,027,943, Cl. 350-17.000.
Exel OY: *See—*
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Extracorporeal Medical Specialties Inc.: *See—*
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F. Jos. Lamb Company: *See—*
Van Deberg, Walter H., 4,027,759.
Fagerhaug, Bjorn; and Oberg, Karl, to Kvaerner Brug A/S. Procedure and device for rapid composting of organic waste. 4,028,189, Cl. 195-109.000.
Fahlen, Nils; and Schei, Asle, to ASEA Aktiebolag. Means for increasing the stability in high-voltage power supply networks. 4,028,592, Cl. 361-16.000.
Failla, Henri; Schaller, Karl; and Vidard, Michel, to Commissariat A l'Energie Atomique. Provision for cooling the top end of a suspended vessel, such as the pressure vessel of a nuclear reactor. 4,028,177, Cl. 176-38.000.
Fairbanks, John B., Jr. Method and structure for curing and/or treating wood. 4,027,401, Cl. 34-16.500.
Fairchild Camera and Instrument Corporation: *See—*
Deal, Bruce E.; and Hu, Daniel C., 4,027,380.
Fairchild Industries Inc.: *See—*
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Faktor, Marc Marian; Ambridge, Thomas; and Bremner, Ean Grant, to Post Office, The. Measuring arrangements. 4,028,207, Cl. 204-195.00R.
Fanciullo, Ralph D.; and Fasolino, Ludwig G., to Polaroid Corporation. Flat battery. 4,028,479, Cl. 429-152.000.
Fang, James C., to Du Pont de Nemours, E. I., and Company. Coating compositions containing esters of dibasic acids, glycols and glycidyl esters, and polyisocyanates. 4,028,309, Cl. 260-77.5AN.
Fantuzzo, Joseph; Ferguson, Robert M.; and Weigl, John W., to Xerox Corporation. Apparatus for interposition environment. 4,027,964, Cl. 355-10.000.
Farcinade, Michel. Apparatus for controlling pharmaceutical ampoules. 4,028,553, Cl. 250-576.000.
Farelli, Mario. Terminal for the fuel filling pipe of a motor vehicle. 4,027,910, Cl. 296-1.00C.
Farfor, James Douglas, to Fictor Pty. Limited. Rotatable concrete profiling means. 4,028,036, Cl. 425-374.000.
Fasolino, Ludwig G.: *See—*
Fanciullo, Ralph D.; and Fasolino, Ludwig G., 4,028,479.
Fassino, Lorenzo. Negative impedance repeater for telephone lines. 4,028,505, Cl. 179-170.00G.
Fastway Fasteners, Inc.: *See—*
Schuplin, Jerome T., 4,027,454.
Feenan, Patrick J.; and Walton, Edward B. Oil cooler control. 4,027,643, Cl. 123-196.0AB.
Fein, Michael E.: *See—*
Byrum, Bernard W., Jr.; Fein, Michael E.; and Ernsthausen, Roger E., 4,028,578.
Feinauer, Roland: *See—*
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Feldl, Erich J. Fireplace damper release mechanism. 4,027,655, Cl. 126-288.000.
Feldman, Daniel W.: *See—*
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Feldmann, Rainer; and Feinauer, Roland, to Chemische Werke Huls Aktiengesellschaft. Polylaurylactam having a low fisheye gel content. 4,028,314, Cl. 260-78.00L.
Felix, Thomas R. Rifle scope mount. 4,027,414, Cl. 42-1.0ST.
Felty, John T.; and Ellerbrock, Francis J., to General Time Corporation. Day-date mechanism for travel clock. 4,027,468, Cl. 58-4.00R.

Ferguson, Robert M.: *See—*
Fantuzzo, Joseph; Ferguson, Robert M.; and Weigl, John W., 4,027,964.
Ferris, David D.; and Harrison, Kenneth E., to Heyl & Patterson, Inc. Process and apparatus for cleaning very fine ore. 4,028,228, Cl. 209-39.000.
Fessler, Dyral C.; Heavner, George A.; and Massey, Thomas H., to Morton-Norwich Products, Inc. (Substituted)ureidoacetohydroxamic acids. 4,028,401, Cl. 260-500.50H.
Fessler, Herman Sylvester, to McLean Engineering Midwest. Air conditioner. 4,027,498, Cl. 62-263.000.
Fiber Industries, Inc.: *See—*
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Fictor Pty. Limited: *See—*
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Fiddler, Theodore E. Liquid level actuated electrical switch. 4,028,512, Cl. 200-84.00C.
Fiecchi, Alberto, to Bioresearch Limited. Process of preparing double salts of S-adenosyl-L-methionine. 4,028,183, Cl. 195-28.00N.
Fields, Gerald S., to Parma Industries, Inc. Centrifugal air precleaner for internal combustion engines. 4,028,076, Cl. 55-394.000.
Fillion, Romeo. Automatic food feeding device for fish, fowl and the like. 4,027,627, Cl. 119-51.110.
Finch, Lester M., to United States of America, Energy Research and Development Administration. Support grid for fuel elements in a nuclear reactor. 4,028,180, Cl. 176-78.000.
Fink, Hans-Ferdi; Fritsch, Herwig; Koerner, Gotz; Rossmy, Gerd; and Schmidt, Gunter, to Th. Goldschmidt AG. Defoaming composition and method of defoaming aqueous solutions or dispersions. 4,028,218, Cl. 252-321.000.
Finney, Robert H.; and Schmidt, Warren E., to Lord Corporation. Rotor blade retention system. 4,028,002, Cl. 416-134.00A.
Finspa Engineering Co. Limited: *See—*
Bridge, Donald John Henry, 4,027,453.
Finzel, Sigismund: *See—*
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Fischler, Henryk; Krupka, Yaakov; and Itzchak, Jacov, to Yeda Research & Development Co. Ltd. Heart beat detector. 4,027,663, Cl. 128-2.06R.
Fish, Herbert L. Ratchet-type torque wrenches with extended torque range. 4,027,558, Cl. 81-52.40R.
Fisher, Billie Eugene; and Hodges, Thompson Eugene. Microform viewer for use with a rigid frame. 4,027,959, Cl. 353-77.000.
Fitch, Robert B.: *See—*
Varga, Leroy M.; and Fitch, Robert B., 4,027,578.
Fleckenstein, Erwin; and Mischke, Peter, to Hoechst Aktiengesellschaft. Basic azo amino-phenylene dyestuffs. 4,028,321, Cl. 260-146.00R.
Fletcher, Arthur T., to Fletcher-Terry Company, The. Scraper. 4,027,388, Cl. 30-171.000.
Fletcher-Terry Company, The: *See—*
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Flowers, Theodore Robert; and Schaefer, Hermann Reinhold, to Sperry Rand Corporation. Skin treatment appliance. 4,027,348, Cl. 15-22.00R.
Floyd, Johnnie E., to Engineering & Research Associates, Inc. Blood mixing and weight monitoring apparatus. 4,027,735, Cl. 177-118.000.
Fluid Device Corporation: *See—*
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FMC Corporation: *See—*
Chiu, Tony T.; and Strasser, Jurgen H., 4,027,450.
Wilson, Donald C., 4,027,456.
Foldessy, Joseph, Jr. Microfiche marking system. 4,027,411, Cl. 40-106.100.
Foley, Kevin M., to Owens-Corning Fiberglas Corporation. Method of preparing organosilicon carboxylates. 4,028,391, Cl. 260-448.20D.
Folsom, Lawrence R., to Advanced Power Systems. Power systems. 4,027,475, Cl. 60-39.610.
Ford Aerospace & Communications Corporation: *See—*
Heilig, Louis F.; and Frazer, Alson C., 4,027,834.
Ford, James M., to Olin Corporation. Variable gap anode assembly for electrolytic cells. 4,028,213, Cl. 204-286.000.
Ford, James M.; and Macken, Elmer N., to Olin Corporation. Adjustable electrode. 4,028,214, Cl. 204-286.000.
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Hetke, Adolf, 4,028,062.
Kushida, Toshimoto; and Logothetis, Eleftherios M., 4,028,642.
Forni, Jay S. Asbestos-cement pipe fitting and method for making it. 4,027,901, Cl. 285-55.000.
Forsberg, John Wesley, to Lubrizol Corporation, The. Method of rerefining oil with recovery of useful organic additives. 4,028,226, Cl. 208-180.000.
Forster, Heinz: *See—*
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Foster, Billy E., to United States of America, Energy Research and Development Administration. Method of simulating spherical voids for use as a radiographic standard. 4,028,545, Cl. 250-252.000.
Foster, Edwin E.; and Foster, Thomas E., to Ladney, Michael, Jr. Wheel cover. 4,027,919, Cl. 301-37.0TP.
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Fountain, Gerald F.; Veloz, Jaime; Bilson, Edward A.; and Cronin, John A., to Inspiration Consolidated Copper Company. Froth flotation with sewage treatment plant water effluent. 4,028,235, Cl. 210-44.000.
Fowler, John T.; and Furey, Donald R., to Laitram Corporation, The. Single pivot remote reading compass. 4,027,398, Cl. 33-363.00K.
Fox, Daniel Wayne, to General Electric Company. Thermally stable flame-retardant thermoplastic molding composition. 4,028,335, Cl. 260-45.75B.
Foxell, Gunnar. Method and device for simultaneous screening of sets of color-separated half-tone negatives. 4,027,969, Cl. 355-73.000.
Frame, Bruce H., to Raymond Lee Organization, Inc., The, a part interest. Bicycle type ski apparatus. 4,027,891, Cl. 280-7.140.
Franaszek, Peter Anthony; and Thompson, David Allen, to International Business Machines Corporation. Apparatus and method for generating a data code with a spectral null. 4,028,535, Cl. 235-152.000.
Francis, Robert John; and Allen, John Glyn, to Hoffmann-La Roche Inc. Isoquinoline derivatives. 4,028,363, Cl. 260-286.00R.
Frank, Earl E.; and Yee, Bing S., to Abex Corporation. Hydraulic apparatus. 4,027,595, Cl. 104-26.00A.
Frank W. Schaefer Inc.: *See—*
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Frankenberg, Robert J., to Hewlett-Packard Company. Method and apparatus for refreshing semiconductor memories in multi-port and multi-module memory system. 4,028,675, Cl. 340-172.500.
Franklin, John S., to General Electric Company. Luminaire. 4,028,541, Cl. 240-25.000.
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Franssen, Nico Valentinus; and Frankort, Frans Josef Maria, to U.S. Philips Corporation. Electroacoustic conversion device having a diaphragm comprising at least one of a piezoelectric polymer material. 4,028,566, Cl. 310-9.500.
Franz Plasser Bahnbaumaschinen-Industrie-Gesellschaft m.b.H.: *See—*
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Frazee, Ralph Edward, Jr.; and Watkins, Laurence Shrapnell, to Western Electric Company,. Method and apparatus for determining ratio of core radius to cladding radius in clad optical fibers. 4,027,977, Cl. 356-111.000.
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Frey, Markus, to Conventa-Stiftung. Method and apparatus for cladding a panel. 4,028,163, Cl. 156-229.000.
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Froeliger, Jacques Ernest Maurice, to Societe d'Etudes de Machines Thermiques. Method for removing and re-installing the crank-shaft

of an internal combustion engine and device for carrying out the said method. 4,027,365, Cl. 29-156.40R.
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Fukushige, Tatsuzo, to Kogaku Ltd. Micrometer microscope with binocular viewing. 4,027,942, Cl. 350-10.000.
Fukushima, Osamu; Nagoshi, Kazuo; and Iwamoto, Toshiaki, to Kuraray Co., Ltd. Method of making sheet material. 4,028,161, Cl. 156-153.000.
Fuller, Don W., to Grindmaster of Kentucky, Incorporated. Nut grinding mill. 4,027,824, Cl. 241-152.00A.
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Funamo, Hiroshi; Kunihiro, Toshiro; and Murai, Masaaki, to Nippon Electric Company, Ltd. Time division communication system adapted to structural expansion. 4,028,495, Cl. 179-15.0AT.
Funk, Adolf; and Kuster, Heinz, to Bauer Kaba AG. Sicherheits-Schliessysteme. Cylinder lock for rotary switches. 4,027,509, Cl. 70-379.00R.
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Glasrock Products, Inc.: *See—*
Dickey, Clarence A., 4,027,789.
Gleason, Robert Joseph, to Research-Cottrel, Inc. Mist eliminator. 4,028,077, Cl. 55-442.000.
Gleason Works, The: *See—*
Evans, Kenneth W.; Howlett, Mason M.; and Kirkpatrick, David H., 4,027,755.
Gleim, William K. T.: *See—*
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Globe Tool and Engineering Company, The: *See—*
Biddison, John M., 4,027,827.
Gloge, Detlef Christoph; Smith, Peter William; and Chinnock, Edwin LeRoy, to Bell Telephone Laboratories, Incorporated. Apparatus for breaking brittle rods or fibers. 4,027,814, Cl. 225-104.000.
Gluck, William. Indexing machine transfer mechanism. 4,027,767, Cl. 198-339.000.
Gluzek, Karl-Heinz: *See—*
Asinger, Friedrich; Offermanns, Heribert; and Gluzek, Karl-Heinz, 4,028,406.
Glyco Chemicals, Inc.: *See—*
MacFadyen, Donald Edward, 4,028,378.
Godfrey, Arthur W.: *See—*
Kablaoui, Mahmoud S.; Reid, Robert E.; and Godfrey, Arthur W., 4,028,258.
Godsey, Charles E., to Continental Oil Company. Method and apparatus for the thermal extraction of hydrocarbons from a solid matrix. 4,028,060, Cl. 23-293.00R.
Goertzel, Gerald: *See—*
Breslau, Franklin Charles; and Goertzel, Gerald, 4,028,667.
Goldman, Myron D., to Litton Business Systems, Inc. Document imprinter. 4,027,585, Cl. 101-91.000.
Goldsmith, Edward E.: *See—*
Mygatt, Leonard T., Jr.; and Goldsmith, Edward E., 4,027,775.
Goldstone, Bertram J.: *See—*
Carey, David R.; Goldstone, Bertram J.; and Thompson, Bernard J., 4,028,700.
Goleman, Joel B. Refrigeration unit air temperature detection alarm system. 4,028,688, Cl. 340-227.100.
Golovkina, Elena Yakovlevna: *See—*
Chachin, Viktor Nikolaevich; Zdor, Gennady Nikolaevich; Zhuravsky, Alexandr Julyanovich; Golovkina, Elena Yakovlevna; and Shaduya, Vladimir Leontievich, 4,027,515.
Golovoy, Amos, to Ford Motor Company. Process for producing powder paint particles from liquid paint I. 4,028,326, Cl. 260-42.220.
Golovoy, Amos, to Ford Motor Company. Process for producing powder paint particles from liquid paint II. 4,028,327, Cl. 260-42.220.
Golumbic, Harvey J., to Vinyl-Chem International, Inc. Precured strip method for repairing flexible materials. 4,028,160, Cl. 156-98.000.
Good, Carleton R., to School Health Supply Company. Eye-testing apparatus. 4,027,954, Cl. 351-17.000.
Goodfellow, Anthony Gerald; and Rand, Maurice, to Dunlop Limited. Moulding apparatus. 4,028,042, Cl. 425-515.000.
Goodman, James A. Automatic packaging apparatus. 4,027,458, Cl. 53-55.000.
Goodyear Tire & Rubber Company, The: *See—*
Jalics, George, 4,028,486.
Thompson, Donald R., 4,027,843.
Throckmorton, Morford C., 4,028,272.
Wolfe, Merritt W., 4,028,168.
Goppel, Johan M.; and Chant, Peter R., to Shell Oil Company. Method of producing an article of thermosetting resin. 4,028,477, Cl. 428-285.000.
Gossmann, Willi: *See—*
Kunkel, Heinrich; Brandenstein, Manfred; Olschewski, Armin; Finzel, Sigismund; Gossmann, Willi; and Horling, Peter, 4,027,932.
Gotaverken Angteknik AB: *See—*
Jansson, Stig, 4,027,604.
Goto, Kenji; Shibata, Norio; and Hashiguchi, Yukihide, to Toyota Jidosha Kogyo Kabushiki Kaisha. Flow rate control mechanism for use in exhaust gas re-circulating system. 4,027,635, Cl. 123-119.00A.
Gottlieb, Nathan, to American Optical Corporation. Illuminated system for vertical fluorescent microscopy. 4,027,944, Cl. 350-91.000.
Gould, Walter M. Method of molding a composite synthetic roofing structure. 4,028,450, Cl. 264-45.500.
Graffenberger, Wilhelm; and Onken, Gerd, to U.S. Philips Corporation. Push-pull amplifier arrangement. 4,028,630, Cl. 330-15.000.
Graham, Ross Chipman, to RCA Corporation. Read/write character generator memory loading method. 4,028,724, Cl. 358-160.000.
Granger, Floyd Randolph; and Granger, Michael Gerard. Solar panel. 4,027,447, Cl. 52-618.000.
Granger, Michael Gerard: *See—*
Granger, Floyd Randolph; and Granger, Michael Gerard, 4,027,447.
Grasso's Koninklijke Machinefabrieken N.V.: *See—*
Keijer, Jan T., 4,028,016.
Graube, Andrejs, to Hughes Aircraft Company. Infrared hologram recording method. 4,028,104, Cl. 96-27.00H.
Gray, Frederick William, to Colgate-Palmolive Company. Bleaching and brightening detergent composition. 4,028,263, Cl. 252-99.000.
Great Lakes Carbon Corporation: *See—*
Mull, Richard T., 4,027,525.
Greenewald, Herbert, Jr. Porous refractory shapes. 4,028,122, Cl. 106-40.00R.
Greenewald, Herbert, Jr. Compacted refractory shapes. 4,028,123, Cl. 106-44.000.
Greenwood, John H.; and Robitschek, Emmerich, to BBC Brown Boveri & Company Limited. Reinforced disk springs. 4,027,865, Cl. 267-148.000.
Greiner, Alan: *See—*
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Grigat, Ernst: *See—*
Rottloff, Gunther; Sundermann, Rudolf; Grigat, Ernst; and Putter, Rolf, 4,028,393.
Grimm, Klaus; and Mengele, Alois, deceased (by Mengele, Dieter Karl Paul, legal representative), to Karl Mengele & Sohne. Chopping machine particularly for the harvest of corn cobs and their comminution. 4,027,826, Cl. 241-221.000.
Grindmaster of Kentucky, Incorporated: *See—*
Fuller, Don W., 4,027,824.
Grolman, Bernard: *See—*
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Groupe Europeen pour la Technique des Turbines a Vapeur G.E.T.T. S.A.: *See—*
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Gruber, Kurt; Keim, Willi; and Hentschel, Klaus, to Mannesmannrohren-Werke AG. Transportation of fossil fuel materials. 4,027,688, Cl. 137-13.000.
Grumman Aerospace Corporation: *See—*
Lewis, Edgar B., 4,028,725.
Gschwend, Heinz Werner, to Ciba-Geigy Corporation. Pyrazolobenzazepines. 4,028,381, Cl. 260-310.00R.
GTE Laboratories Incorporated: *See—*
Kim, Han J.; and Reid, F. Joseph, 4,028,061.
Kim, Han J.; and Reid, F. Joseph, 4,028,063.
GTE Sylvania Incorporated: *See—*
Gates, Paul E.; Kimball, Stephen F.; and Leadvaro, Stephen J., 4,028,577.
Laferty, John M., Jr.; Ritsko, Joseph E.; and Port, David J., 4,028,095.
Stratton, Michael G., 4,028,581.
Gubela, Hans. Apparatus for positioning a pad or book of sheets on the work table of printing apparatus. 4,027,591, Cl. 101-407.0BP.
Gudzenko, Nikolai Vasilievich; Zaichenko, Mikhail Efimovich; and Larin, Konstantin Leonidovich. Jet pump. 4,028,009, Cl. 417-163.000.
Guenther, Robert O.; Huffhines, Donald F.; Krall, James W.; and Ray, Charles D., to Mobil Oil Corporation. Protection means for depth control device. 4,027,616, Cl. 114-244.000.
Guile, Donald L.: *See—*
Bihuniak, Peter P.; and Guile, Donald L., 4,028,124.
Gulbenk, Alin H., to Dow Chemical Company, The. Substituted pyridinylalkoxy-, pyridinylalkylsulfonyl- and pyridinylalkylthiophenylurea herbicides. 4,028,092, Cl. 71-94.000.
Gunther, W. H. H.: *See—*
Chu, Joseph Y. C.; and Gunther, W. H. H., 4,028,203.
Gurtler, Hebert & Co., Inc.: *See—*
Horvath, Lajos (Louis), 4,027,734.
Gustafson, William Roy, to American Cyanamid Company. Hydrotreating of petroleum residuum using shaped catalyst particles of small diameter pores. 4,028,227, Cl. 208-216.000.

Gustafsson, Carl-Erik: *See*—
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Gustav F. Gerdts KG: *See*—
Schnatmeyer, Hans; and Schutzer, Gerhard, 4,027,695.
Zimmermann, Heino, 4,027,534.

Gustavsson, Varne Axel Gerhard; and Moberg, Lars-Goran, to AB Bofors. Wet disc clutch and method of force cooling the same. 4,027,758, Cl. 192-113.00B.

Guterman, Paulette: *See*—
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Gutermann & Co. Aktiengesellschaft: *See*—
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Guthrie, Robert William; and Kierstead, Richard Wightman, to Hoffmann-La Roche Inc. Hydroxycitric acid derivatives. 4,028,397, Cl. 260-468.00G.

Guy, Arthur L., Jr., to Exxon Production Research Company. Method and apparatus for connecting two or more components of an offshore platform. 4,027,493, Cl. 61-96.000.

Guyton, Glen B. Check valve. 4,027,696, Cl. 137-527.400.

H. L. Bouton, Company: *See*—
Hirschmann, Jack B., Jr., 4,027,342.

Haddock, Fred A., to Coburn Optical Industries, Inc. Edging apparatus for ophthalmic lens. 4,027,434, Cl. 51-101.0LG.

Hadtke, Frederick B., to Robert Hain Associates, Inc. Face mask. 4,027,340, Cl. 2-206.000.

Hadtke, Frederick B., to Idex Corporation. Tennis tuner. 4,027,880, Cl. 273-29.00A.

Hagan, Joseph R.: *See*—
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Hagiwara, Kitokazu: *See*—
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Hagon, Peter J.; and Haworth, John, to Rockwell International Corporation. Oscillator using magnetostatic surface wave delay line. 4,028,639, Cl. 331-107.00A.

Hahn, Granville J., to Cosden Oil & Chemical Company. Method and apparatus for blow molding plastic. 4,028,034, Cl. 425-302.00B.

Haigh, Douglas John, to USM Corporation. Rotational moulding machines. 4,028,038, Cl. 425-430.000.

Hainaut, Daniel; and Demoute, Jean-Pierre, to Roussel-UCLAF. Novel β-ketone compounds. 4,028,386, Cl. 260-410.90R.

Hajek, Manfred: *See*—
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Halcon International, Inc.: *See*—
Becker, Mitchell; and Yang, Charles C., 4,028,195.

Hall, James N. Telephone lock. 4,028,508, Cl. 179-189.00D.

Halloran, John D. Apparatus for, and method of, measuring dynamic forces. 4,027,539, Cl. 73-465.000.

Halmaghi, Victor. Cigarette extinguishing and cigar cutting device. 4,027,682, Cl. 131-233.000.

Hamada, Noboru: *See*—
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Hamaguchi, Sachihiko; Oomura, Ikuo; Sato, Tadashi; and Wada, Hisashi, to Matsushita Electric Industrial Co., Ltd. Method and apparatus for delivery alarm for livestock animals. 4,028,687, Cl. 340-201.00R.

Hamblin, Leslie Frank, to Lamburn, Alan Salisbury, a part interest. Extensible interlocking structure of multi-lateral cross-section. 4,027,440, Cl. 52-108.000.

Hanebuth, Paul N., to Stewart-Warner Corporation. Method for joining a tip for a flexible shaft and assembly thereof. 4,027,501, Cl. 64-4.000.

Hannie, David Eugene, to Eastman Kodak Company. Processing compositions for color transfer processes comprising alkali metal fluorides and oxalates. 4,028,103, Cl. 96-29.00D.

Hannover, Finn, to Du Pont de Nemours, E. I., and Company. Water-degradable coupling member. 4,027,903, Cl. 285-156.000.

Hansel, William B., to Suntech, Inc. Dispensing nozzle control system. 4,027,708, Cl. 141-209.000.

Harden, John Charles; and Mastrangelo, Sebastian V. R., to Du Pont de Nemours, E. I., and Company. Pressure-sensitive elastic resistor compositions. 4,028,276, Cl. 252-513.000.

Hardouin, Pierre: *See*—
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Hardwick, Thomas Lee Richard. Receptacle transporting vehicle. 4,027,808, Cl. 214-313.000.

Harkki, Seppo Untamo: *See*—
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Harrill, Thomas D. Circle cutting attachment for band saw. 4,027,566, Cl. 83-411.00R.

Harrison, Kenneth E.: *See*—
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Hart, John Michael; and Varah, James Shadrach, to Kangol Magnet Limited. Buckles for vehicle safety belts. 4,027,362, Cl. 24-230.0AL.

Harter Corporation: *See*—
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Hartmann, Clinton S.; and Stigall, Robert E., to Texas Instruments Incorporated. Tunable surface wave device resonator. 4,028,648, Cl. 333-72.000.

Hartung, Kuhn & Co. Maschinen fabrik GmbH: *See*—
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Hasebe, Nobutoshi: *See*—
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Hasenwinkle, Earl Dean; and Wislocker, Frank, to Weyerhaeuser Company. Machine for conveying sector shaped pieces. 4,027,769, Cl. 198-570.000.

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Hashimoto, Makoto; Uehara, Shinzi; Sugita, Tadashi; and Shiina, Naonori, to Furukawa Electric Co., Ltd., The. Method of molding plastics material. 4,028,448, Cl. 264-37.000.

Hassinger, Donald F.: *See*—
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Hattes, Neil R.: *See*—
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Hawes, Edward C.: *See*—
Hawes, Edward L.; Hawes, Allen R.; and Hawes, Edward C., 4,027,899.

Hawes, Edward L.; Hawes, Allen R.; and Hawes, Edward C. Motorcycle trailer. 4,027,899, Cl. 280-722.000.

Hawkins, Wallace H. Coupling head for securing a vehicle towing assembly. 4,027,894, Cl. 280-502.000.

Haworth, John: *See*—
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Hay, Allan S., to General Electric Company. Process for the preparation of polyphenylene oxides with hydrolytically stable copper catalysts. 4,028,341, Cl. 260-47.0ET.

Hayashi, Hideo: *See*—
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Hayashi, Kazuya; Mizunuma, Takeji; and Yokotsuka, Tamotsu, to Kikkoman Shoyu Co., Ltd. Process for producing koji for fermented food products. 4,028,470, Cl. 426-11.000.

Hayes, John C.; and Pollitzer, Ernest L., to UOP Inc. Guard beds in hydrocarbon conversion with an acidic multimetallic catalytic composite. 4,028,223, Cl. 208-91.000.

Hayes, William H., Jr.: *See*—
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Hayes, William Roger; and Shikasho, Satoru, to International Telephone and Telegraph Corporation. Solar heating/cooling system. 4,027,821, Cl. 237-1.00A.

Haynes, Gardner S.: *See*—
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Haynie, Gerald Demarest: *See*—
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Heavner, Paul William, Jr.; and Long, Gregor Dean, to Baxter Travenol Laboratories, Inc. Diagnostic electrode assembly with a skin preparation surface. 4,027,664, Cl. 128-2.06E.

Heberlein Maschinenfabrik AG: *See*—
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Hechtfischer, Gustav: *See*—
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Hegar, Gert; and Angliker, Hans-Joerg, to Ciba-Geigy AG. Process for making azo compounds by coupling with nitrosated heterocyclic primary amines. 4,028,323, Cl. 260-157.000.

Heggie, William S., to Canadian Patents and Development Limited. Transducer for engine fuel injection monitoring. 4,027,536, Cl. 73-398.0AR.

Heilig, Louis F.; and Frazer, Alson C., to Ford Aerospace & Communications Corporation. Missile nozzle configuration. 4,027,834, Cl. 244-3.110.

Helda, Robert W., to Motorola, Inc. Contact bonded packaged integrated circuit. 4,028,722, Cl. 357-70.000.

Heller, Lawrence Griffith; Terman, Lewis Madison; and Yee, Yen Sung, to International Business Machines Corporation. High accuracy MOS comparator. 4,028,558, Cl. 307-355.000.

Henkels, Walter H., to International Business Machines Corporation. Ultralow-power, micro-miniaturized Josephson devices having high inductance. 4,028,714, Cl. 357-5.000.

Henley, John C., III. Process and apparatus for producing printed matter. 4,028,107, Cl. 96-41.000.

Henry, Walton M.: *See—*
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Hentschel, Klaus: *See—*
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Hercules Incorporated: *See—*
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Herd, Richard S.; and Otto, Ferdinand P., to Mobil Oil Corporation. Process for preparing a metal salt of an oxidized, phosphosulfurized hydrocarbon and lubricant compositions containing same. 4,028,259, Cl. 252-46.700.

Hermann nee Szente, Ilona: *See—*
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Herrera-Gutierrez, Jesus. Closure device for bags or similar containers. 4,027,819, Cl. 229-65.000.

Hestermann, Klaus: *See—*
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Hetzel, Thomas Robert, to Thomas Industries, Inc. Unloader for air compressor with wobble piston. 4,028,015, Cl. 417-415.000.

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Hickmann, Karl; and Sahmkow, Dieter, to Dragerwerk Aktiengesellschaft. Apparatus for wetting respiratory gas. 4,028,445, Cl. 261-142.000.

Hidehiko, Kobayashi: *See—*
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Higashide, Carlos S., to Honeywell Inc. Printer control system. 4,028,669, Cl. 340-172.500.

Higginbottom, Harold P., to Monsanto Company. High efficiency stable aqueous resoles. 4,028,367, Cl. 260-29.300.

Hildebrand, Kurt. Safety ski binding. 4,027,897, Cl. 280-631.000.

Hillel, Daniel I. Method and apparatus for conserving soil water. 4,027,428, Cl. 47-58.000.

Hiltebrandt, Siegfried. Forceps. 4,027,510, Cl. 72-37.000.

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Hinata, Masanao; Takei, Haruo; Sato, Akira; Iwamoto, Atsuo; and Hayashi, Jun, to Fuji Photo Film Co., Ltd. Silver halide photographic emulsion sensitized to red with four carbocyanine dyes. 4,028,115, Cl. 96-124.000.

Hipchen, Donald E.; Skowronski, Michael J.; and Hagan, Joseph R., to Celotex Corporation, The. Structural laminate and method for making same. 4,028,158, Cl. 156-79.000.

Hirai, Masahide; Fujimura, Mikio; Kazigase, Masahiro; and Saito, Minoru, to Unitika Ltd. Phenolic chelate resin. 4,028,284, Cl. 260-2.20C.

Hirakawa, Seishiro; Kanai, Shyuji; Ikeda, Matsuo; and Hirata, Toshinori, to Mitsui Mining & Smelting Co., Ltd. Apparatus for automatically replacing electrodes used for electrolytic refining of metal. 4,028,211, Cl. 204-267.000.

Hirashima, Kenzo; Tsujimura, Harutoshi; Hasegawa, Akira; Tanigami, Takahiko; and Ushiku, Kenichi, to Hitachi, Ltd.; and Nissan Motor Co., Ltd. Acceleration detector switch having magnetic biased conductive oscillating controller. 4,028,516, Cl. 200-61.45M.

Hirata, Toshinori: *See—*
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Hirosawa, Yoshiaki; Nomura, Toshio; and Iiyama, Masahiko, to Honda Giken Kogyo Kabushiki Kaisha. Automatic choke valve apparatus in an internal combustion engine. 4,027,640, Cl. 123-179.00G.

Hirschberger, Leonard: *See—*
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Hockett, Wayne. Sand blasting apparatus. 4,027,433, Cl. 51-410.000.

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Hodler, Fritz. Pressure die-casting block with a venting valve. 4,027,726, Cl. 164-305.000.

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Kuhnelt, Herbert; and Huber, Rudolf, 4,027,744.

Hoerner, Eugen. Advertising lettering and support therefor. 4,027,412, Cl. 40-125.00R.

Hoffman, Herbert H. Planing and cutting tool. 4,027,647, Cl. 125-6.000.

Hoffman, Roy Louis; Kempke, William George; and Soltis, Frank Gerald, to International Business Machines Corporation. Fetch instruction for operand address calculation. 4,028,670, Cl. 340-172.500.

Hoffmann, Gunter: *See—*
Braun, Walter; and Hoffmann, Gunter, 4,028,072.

Hoffmann-La Roche Inc.: *See—*
Bocion, Pierre; De Silva, Wijitha; and Winternitz, Pavol, 4,028,089.
Fischer, Ulf; and Lorch, Eckehard, 4,028,402.
Francis, Robert John; and Allen, John Glyn, 4,028,363.
Guthrie, Robert William; and Kierstead, Richard Wightman, 4,028,397.
Partridge, John Joseph, Jr.; and Uskokovic, Milan Radoje, 4,028,349.

Hohner, Gary Arlyn; and Hyldon, Roy Godfrey, to Quaker Oats Company, The. Oat groat fractionation process. 4,028,468, Cl. 426-436.000.

Holland, Frank Stanley, to National Development Research Corporation. Method of producing metal powder. 4,028,199, Cl. 204-10.000.

Hollandsche Wegenbouw Zanen B.V.: *See—*
van den Berg, Antoon J., 4,028,293.

Hollymatic Corporation: *See—*
Wagner, Richard C.; and Banike, Ronald A., 4,027,356.

Holmberg, Leif, to European Plastic Machinery Mfg. A/S. Apparatus for establishing contact between a liquid and a gas. 4,028,244, Cl. 210-150.000.

Holmlund, Gary Wayne; and Ichino, Toshio, to Hewlett-Packard Company. Marker circuit. 4,028,587, Cl. 315-377.000.

Holmstrom, Hakan: *See—*
Rausing, Ruben; Nedstedt, Gert; Holmstrom, Hakan; Palm, Lars-Erik; and Stefan, Stjepan, 4,027,455.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Hirosawa, Yoshiaki; Nomura, Toshio; and Iiyama, Masahiko, 4,027,640.
Yamamoto, Takenori; Tsukisaka, Tsuneo; and Tsukahara, Takeshi, 4,027,914.

Honeywell Inc.: *See—*
Higashide, Carlos S., 4,028,669.
Kasenga, Anthony F., 4,028,145.

Honeywell Information Systems, Inc.: *See—*
Monahan, Earnest M.; and Patterson, Garvin W., 4,028,664.
Riikonen, Douglas L., 4,028,668.

Honeywell Information Systems Italia: *See—*
Orlando, Luciano, 4,028,612.

Honkawa, Yoshinori: *See—*
Tasaka, Tomoyuki; and Honkawa, Yoshinori, 4,027,588.

Honore, Etienne A. H.; and Torcheux, Emile L. G., to Societe d'Etude et d'Application des Techniques Nouvelles NEO-TEC. Apparatus for radio position-fixing of the hyperbolic phase-measurement type. 4,028,703, Cl. 343-105.00R.

Hooker Chemicals & Plastics Corporation: *See—*
Kahn, Henry; and Schall, William L., 4,028,329.

Hooker, Joe B., to Metal Bed Rail Company, division of Leggett & Platt, Inc. Bed frame with detachable and interchangeable components. 4,027,343, Cl. 5-200.00R.

Hopkins, Donald L., to Caterpillar Tractor Co. Reversible, variable-

displacement piston pump with positioner means for automatic return to zero displacement. 4,028,010, Cl. 417-217.000.

Hoppner, Werner F.; Spinelli, Richard A.; and Allis, Robert F., to Xerox Corporation. Multi-mode reproducing apparatus. 4,027,963, Cl. 355-8.000.

Hoppough, Richard Scott, to Bell Telephone Laboratories, Incorporated. Apparatus for applying particular voltages to three-terminal circuits and measuring resulting current flows for the purpose of determining circuit characteristics. 4,028,507, Cl. 179-175.30R.

Hori, Haruo; Kikuchi, Shoji; Wada, Hajime; Kobayasi, Sadatosi; and Endo, Takaya, to Konishiroku Photo Industry Co., Ltd. Method for developing an exposed silver halide color photosensitive material. 4,028,106, Cl. 96-55.000.

Horikoshi, Yoshiji, to Nippon Telegraph and Telephone Public Corporation. Method of epitaxially growing a laminate semiconductor layer in liquid phase. 4,028,148, Cl. 148-171.000.

Horling, Peter: *See—*
Kunkel, Heinrich; Brandenstein, Manfred; Olschewski, Armin; Finzel, Sigismund; Gossmann, Willi; and Horling, Peter, 4,027,932.

Horvath, Gyula: *See—*
Bite, Pal; Moravcsik, Imre; Schafer, Inge; Horvath, Gyula; Mehesfalvi nee Vajna, Zsuzsanna; Borvendeg, Janos; and Hermann nee Szente, Ilona, 4,028,348.

Horvath, Lajos (Louis), to Gurtler, Hebert & Co., Inc. Deviated conductor driving system. 4,027,734, Cl. 175-9.000.

Hosaka, Yukio: *See—*
Yamamoto, Tomio; Sakasegawa, Koji; Osumi, Atsushi; Hosaka, Yukio; and Yamada, Takeo, 4,027,978.

Hoshino, Norio: *See—*
Konishi, Yoshihiro; Konno, Kenichi; Yazawa, Norihiko; and Hoshino, Norio, 4,028,650.

Hotta, Seiji; Koga, Koichi; Bando, Tomoyuki; and Kondo, Yutaka, to Sumitomo Chemical Company, Limited; and Kyodo Chemical Company, Ltd. Ultra violet absorber. 4,028,331, Cl. 260-45.8NT.

Hounsfield, Godfrey Newbold, to EMI Limited. Radiology. 4,028,554, Cl. 250-445.00T.

House, Aniel Hermas, Jr. Cleat for climbing trees and the like. 4,027,742, Cl. 182-92.000.

Hovagimyan, Norman; Iadicola, Anthony Domenic; and Ianuzzi, William Paul, to RCA Corporation. Universal/assigned night answering system for EPABX. 4,028,499, Cl. 179-18.0BD.

Howlett, Mason M.: *See—*
Evans, Kenneth W.; Howlett, Mason M.; and Kirkpatrick, David H., 4,027,755.

Hromatka, Otto; and Binder, Dieter, to BASF Aktiengesellschaft. Thiophene saccharines. 4,028,373, Cl. 260-301.000.

Hu, Daniel C.: *See—*
Deal, Bruce E.; and Hu, Daniel C., 4,027,380.

Hubbard, David W., to Pitney-Bowes, Inc. Method for printing a manually scannable bar code and articles carrying a vertically extended bar code. 4,027,586, Cl. 101-93.010.

Huber, Rudolf: *See—*
Kuhnelt, Herbert; and Huber, Rudolf, 4,027,744.

Hubsch, Gunter; Bendler, Hellmut; Stahlmann, Rudolf; and Gawlick, Heinz, to Dynamit Nobel Aktiengesellschaft. Propellant charge igniter with striker element. 4,027,592, Cl. 102-70.00R.

Huddleston, Jack M., to National Distillers and Chemical Corporation. Bearing lubricator. 4,027,929, Cl. 308-97.000.

Hufenus, Paul Francis Marcel. Tennis racket with variable balance and weight. 4,027,881, Cl. 273-73.00R.

Huffhines, Donald F.: *See—*
Guenther, Robert O.; Huffhines, Donald F.; Krall, James W.; and Ray, Charles D., 4,027,616.

Hughes Aircraft Company: *See—*
Graube, Andrejs, 4,028,104.
Kamath, G. Sanjiv; and Smith, Bradley W., 4,028,147.
King, Harry J., 4,028,579.
Leetmaa, Juri G., 4,028,651.
Zurcher, Rudolf F., 4,028,509.

Hughes, Richard Swart, to United States of America, Navy. Acousto-optical deflector tuned organic dye laser. 4,028,636, Cl. 331-94.50C.

Hugues, Edgard Alfred, to U.S. Philips Corporation. Single optical lens with large aperture and large field. 4,027,952, Cl. 350-189.000.

Hujimori, Masao; Nakajima, Shigeo; Takahashi, Ken; Ito, Tsunetoshi; Shimada, Toshio; and Endo, Hajime, to Taiheiyo Engineering Incorporated. Longwall coal mining machine with plural cutters on subranging arm. 4,027,918, Cl. 299-53.000.

Hulsebos, Jan, to Cities Service Company. Process and apparatus for recovering dissolved copper from solutions containing copper. 4,027,864, Cl. 266-170.000.

Hungerford & Terry, Inc.: *See—*
Davis, Raymond R.; Langberg, Alfred M.; and Debus, Alvin P., 4,028,241.

Hunt, Charles d'A., to Airco, Inc. Electron beam furnace. 4,027,722, Cl. 164-64.000.

Hunt, Paulmer D., to Bendix Corporation, The. Fluid pressure responsive transducer apparatus. 4,027,481, Cl. 60-533.000.

Hunter Douglas International N.V.: *See—*
Brugman, Johannes Antonius Henricus, 4,027,446.

Huntress, Charles B.; and Gabrielian, Henry, to Electronic Engineering Company of California. Transducer switching system. 4,028,491, Cl. 179-1.0SW.

Hurley, Carson Monroe. Recation speed training device. 4,027,875, Cl. 272-76.000.

Hurni, William M.: *See—*
McAleer, William J.; and Hurni, William M., 4,028,190.

Huschka, Hans; Schmutz, Hermann; and Vygen, Peter, to Nukem G.m.b.H. Fuel particles with coatings without property gradients. 4,028,181, Cl. 176-82.000.

Hycom Incorporated: *See—*
Motley, David M.; and Cheng, King Y., 4,028,626.

Hyldon, Roy Godfrey: *See—*
Hohner, Gary Arlyn; and Hyldon, Roy Godfrey, 4,028,468.

I-T-E Imperial Corporation: *See—*
Laubach, Ward E., 4,028,513.

Iadicola, Anthony Domenic: *See—*
Hovagimyan, Norman; Iadicola, Anthony Domenic; and Ianuzzi, William Paul, 4,028,499.

Ianuzzi, William Paul: *See—*
Hovagimyan, Norman; Iadicola, Anthony Domenic; and Ianuzzi, William Paul, 4,028,499.

Ichino, Toshio: *See—*
Holmlund, Gary Wayne; and Ichino, Toshio, 4,028,587.

ICI Australia Limited: *See—*
Bolto, Brian Alfred; and Eldridge, Robert James, 4,028,255.

Ide, Akira: *See—*
Ogawa, Shinsaku; Ide, Akira; Komatsu, Kazurou; Matsumoto, Sojiro; and Kishimoto, Yasushi, 4,028,392.

Idemitsu, Kosan Kabushiki-Kaisha (Idemitsu Kosan Co., Ltd.): *See—*
Seki, Kenji; Kimura, Akio; Asahi, Satoshi; and Takeshita, Yasuhiro, 4,028,435.

Idex Corporation: *See—*
Hadtke, Frederick B., 4,027,880.

Igeta, Harutoshi. Seat belt assembly. 4,027,900, Cl. 280-745.000.

Iiyama, Masahiko: *See—*
Hirosawa, Yoshiaki; Nomura, Toshio; and Iiyama, Masahiko, 4,027,640.

Ikeda, Matsuo: *See—*
Hirakawa, Seishiro; Kanai, Shyuji; Ikeda, Matsuo; and Hirata, Toshinori, 4,028,211.

Ikeda, Tadashi: *See—*
Sato, Akira; Ikeda, Tadashi; Sueyoshi, Tohru; Nakamura, Yasuharu; and Shimada, Takeo, 4,028,112.

Ikeda, Tsunemi; and Sezaki, Tamotsu, to Kawasaki Jukogyo Kabushiki Kaisha. Grating apparatus for protecting the draft port of a water-jet propulsion system. 4,027,617, Cl. 115-14.000.

Ikushima, Hiroshi; Nakajima, Yasuo; Hagiwara, Kitokazu; and Nagata, Takashi, to Matsushita Electric Industrial Co., Ltd. Elastic surface wave devices and method for making the same. 4,028,646, Cl. 333-72.000.

Illinois Tool Works Inc.: *See—*
Desio, Frank B.; and Webb, Samuel Lee, 4,028,515.
Madland, Robert Christen; Zielinski, Robert Michael, Jr.; and Engstrom, Keith Allen, 4,028,696.

Imada, Yasuo: *See—*
Mizutani, Yoshiyuki; Tada, Masaaki; and Imada, Yasuo, 4,028,097.

Imai, Ko: *See—*
Kamatani, Yoshio; Okazaki, Hisayoshi; Imai, Ko; Fujita, Noriaki; Yamazaki, Yoshio; and Ogino, Katsuhiko, 4,028,185.

Imai, Tetsu: *See—*
Kuroda, Michio; Namura, Kiyoshi; Kato, Fumio; Yamazaki, Yoshiaki; Iwasaki, Tutomu; Ishida, Akira; Sohma, Akio; and Imai, Tetsu, 4,028,006.

Imhof, Hugo, to S.A.F. Societe Agricole et Fonciere S.A. Installation for pelletizing organic waste materials. 4,028,030, Cl. 425-135.000.

Immel, Otto: *See—*
Schwarz, Hans-Helmut; and Immel, Otto, 4,028,347.

Imperial Chemical Industries Limited: *See—*
Gent, Colin William, 4,028,067.

Imperial Metal Industries (Kynoch) Limited: *See—*
McDougall, Ian Leitch, 4,028,488.

Inagaki, Hiroshi: *See—*
Nakasuji, Norikazu; Kataoka, Takashi; Inagaki, Hiroshi; and Nakashima, Sunao, 4,028,118.

Ing. C. Olivetti & C., S.p.A.: *See—*
Salto, Rinaldo, 4,027,763.
Sargentini, Enrico; and Carena, Ugo, 4,027,766.
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Vittorelli, Vittore, 4,028,681.

Inoue, Akira: *See—*
Doi, Tsunesuke; Komoto, Hiroshi; Chono, Masazumi; Inoue, Akira; Saito, Kazuaki; and Shinozuka, Isao, 4,028,055.

Inspiration Consolidated Copper Company: *See—*
Fountain, Gerald F.; Veloz, Jaime; Bilson, Edward A.; and Cronin, John A., 4,028,235.

Institut Francais du Petrole: *See—*
Dawans, Francois; and Durand, Jean-Pierre, 4,028,432.

Interface Biomedical Laboratories Corporation: *See—*
Sawyer, Philip Nicholas; and Stanczewski, Boguslaw, 4,027,392.

Interior Fasteners, Inc.: *See—*
Laverty, Richard C., 4,027,573.

International Business Machines Corporation: *See—*
Arps, Ronald Barthold; Bahl, Lalit Rai; and Weinberger, Arnold, 4,028,731.
Brennemann, Andrew Ernest; and Soo, Suk Suet, 4,028,493.
Breslau, Franklin Charles; and Goertzel, Gerald, 4,028,667.
Byrnes, Herbert P.; and Wahl, Richard, 4,027,935.
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Collins, Robert Henry; Levine, Richard F.; North, William D.; O'Rourke, Gerald D.; and Parker, Gerald R., 4,028,150.
Cook, Peter William; and Schuster, Stanley E., 4,028,694.
Deines, John L.; Ku, San-Mei; Poponiak, Michael R.; and Tsang, Paul J., 4,028,149.
Eggenberger, John Scott; and Voegeli, Otto, 4,028,685.
Engler, Edward M.; and Patel, Vishnubhai V., 4,028,346.
Franaszek, Peter Anthony; and Thompson, David Allen, 4,028,535.
Heller, Lawrence Griffith; Terman, Lewis Madison; and Yee, Yen Sung, 4,028,558.
Henkels, Walter H., 4,028,714.
Hoffman, Roy Louis; Kempke, William George; and Soltis, Frank Gerald, 4,028,670.
Joy, Richard C.; Magdo, Ingrid E.; and Phillips, Alfred, Jr., 4,028,717.
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International Flavors & Fragrances Inc.: *See—*
Ouwerkerk, Anton Van; Chant, Bernard J.; and Liberman, Arthur L., 4,028,279.

International Playtex, Inc.: *See—*
Litt, Morton H.; and Kumar, Narayan Ganesh, 4,028,132.

International Standard Electric Corporation: *See—*
Blair, Peter Kenneth, 4,027,840.
Viohl, Uwe, 4,028,114.

International Telephone and Telegraph Corporation: *See—*
Epstein, Marvin Aaron, 4,028,490.
Hayes, William Roger; and Shikasho, Satoru, 4,027,821.
Krum, Jack Kern; Wollermann, Louis Albert; and Rucker, Dugan Allan, 4,028,471.
Levine, Arnold M., 4,028,702.

International Top Security Corporation: *See—*
Crepinsek, Alois, 4,027,907.
Crepinsek, Alois, 4,027,908.

Interx Research Corporation: *See—*
Bodor, Nicolae S.; and Yuan, Sun-Shine, 4,028,368.

Inventive Industries, Inc.: *See—*
Moricca, Larry S.; and Zaker, Gregory A., 4,028,502.

Iori, Shinichi: *See—*
Jikihara, Kazuo; Iori, Shinichi; Kimura, Ichiro; and Adachi, Kyoichi, 4,028,091.

Irikura, Tsutomu, to Kyorin Pharmaceutical Co., Ltd. Novel pyrazolo [1,5-a]pyridines. 4,028,370, Cl. 260-296.00H.

Iriyama, Keiji: *See—*
Okada, Akira; Iriyama, Keiji; and Shiraki, Masaru, 4,028,217.

Isaac, Peter A. H.; and Oulton, T. Dixon, to Engelhard Minerals & Chemicals Corporation. Reduced charge montmorillonite pigment for sensitizing record material. 4,028,133, Cl. 106-288.00B.

Ishida, Akira: *See—*
Kuroda, Michio; Namura, Kiyoshi; Kato, Fumio; Yamazaki, Yoshiaki; Iwasaki, Tutomu; Ishida, Akira; Sohma, Akio; and Imai, Tetsu, 4,028,006.

Ishidoshiro, Hiroshi: *See—*
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Ishihara, Yosuke: *See—*
Kawamoto, Kyoji; and Ishihara, Yosuke, 4,027,750.

Ishii, Tsumoru: *See—*
Sera, Hidefumi; Nagao, Kameji; and Ishii, Tsumoru, 4,028,320.

Ishikawa, Youhei: *See—*
Wakino, Kikuo; Nishikawa, Toshio; Tamura, Sadahiro; and Ishikawa, Youhei, 4,028,652.

Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See—*
Kawasaki, Kaoru; Sakano, Takeshi; Furuya, Shigeru; and Endo, Shigeru, 4,027,803.

Ishiyama, Jiro; Kato, Motohiko; Yoshida, Fumihiko; and Yokotsuka, Tamotsu, to Kikkoman Shoyu Co., Ltd. Process for producing 3',5'-cyclic adenylic acid. 4,028,184, Cl. 195-28.00N.

Ishizawa, Toshitugu: *See—*
Takeuchi, Hiroshi; Ishizawa, Toshitugu; Yamano, Tetuyuki; Chiba, Ko; and Kobayashi, Daisaku, 4,028,022.

Ishizuka, Ichiro: *See—*
Yukinaga, Hisajiro; Sumimoto, Shinzaburo; Ishizuka, Ichiro; and Sugita, Jitsuo, 4,028,376.

Italiano, Victor J.: *See—*
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Ito, Akiro: *See—*
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Ito, Fumio: *See—*
Kawamura, Masaharu; Sakurada, Nobuaki; Shinoda, Nobuhiko; Ito, Tadashi; Ito, Fumio; and Murakami, Hiroyashu, 4,028,712.

Ito, Masaharu: *See—*
Kawawa, Takaho; and Ito, Masaharu, 4,027,844.

Ito, Tadashi: *See—*
Kawamura, Masaharu; Sakurada, Nobuaki; Shinoda, Nobuhiko; Ito, Tadashi; Ito, Fumio; and Murakami, Hiroyashu, 4,028,712.

Ito, Terukazu; Nakao, Kiyoharu; Minami, Teruo; and Uenoyama, Masaru, to Kabushiki Kaisha Komatsu Seisakusho. Electronic control apparatus of an automatic speed changing apparatus. 4,027,554, Cl. 74-866.000.

Ito, Tsunetoshi: *See—*
Hujimori, Masao; Nakajima, Shigeo; Takahashi, Ken; Ito, Tsunetoshi; Shimada, Toshio; and Endo, Hajime, 4,027,918.

Itoh, Tatsuo, to University of Illinois Foundation. Waveguide having strip dielectric structure. 4,028,643, Cl. 333-6.000.

Itoi, Kazuo: *See—*
Fujita, Yoshiji; Omura, Yoshiaki; Nishida, Takashi; and Itoi, Kazuo, 4,028,385.

ITT Industries, Inc.: *See—*
Geisler, Ulrich, 4,028,563.

Itzchak, Jacov: *See—*
Fischler, Henryk; Krupka, Yaakov; and Itzchak, Jacov, 4,027,663.

IU Conversion Systems, Inc.: *See—*
Webster, William C.; Hilton, Robert G.; and Cotts, Ronald F., 4,028,130.

Iverson, Myren L., to United States of America, Navy. Optical slip-rings. 4,027,945, Cl. 350-96.00C.

Ivester, J. Harold: *See—*
Mehaffey, Joseph H.; Mills, Edgar C.; and Ivester, J. Harold, 4,028,498.

Iwamoto, Atsuo: *See—*
Hinata, Masanao; Takei, Haruo; Sato, Akira; Iwamoto, Atsuo; and Hayashi, Jun, 4,028,115.

Iwamoto, Toshiaki: *See—*
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Iwao, Tetsuya: *See—*
Shiomura, Tetsunosuke; Ito, Akiro; Morimoto, Yoshio; and Iwao, Tetsuya, 4,028,481.

Iwasaki, Masayuki; Misu, Hiroshi; and Miyano, Shizuo, to Fuji Photo Film Co., Ltd. Light-sensitive lithographic printing plate. 4,028,111, Cl. 96-75.000.

Iwasaki, Tutomu: *See—*
Kuroda, Michio; Namura, Kiyoshi; Kato, Fumio; Yamazaki, Yoshiaki; Iwasaki, Tutomu; Ishida, Akira; Sohma, Akio; and Imai, Tetsu, 4,028,006.

J. I. Case Company: *See—*
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J. M. Voith GmbH: *See—*
Schiel, Christian, 4,028,175.

Jack, James: *See—*
Chalmers, Alexander Michael; Jack, James; and Cook, Barry, 4,028,334.

Jackson, J. D. Combined wood burning stove and fireplace. 4,027,649, Cl. 126-4.000.

Jacob, Adir, to LFE Corporation. Process and material for manufacturing thin film integrated circuits. 4,028,155, Cl. 156-643.000.

Jacob, Keith D., to Hassinger, Donald F. Switch controlled adjustable rear view mirror with bimetal means. 4,027,953, Cl. 350-288.000.

Jacobs, Pieter Anton, to U.S. Philips Corporation. Memory with error detection and correction means. 4,028,539, Cl. 235-153.0AM.

Jakob Muller, Forschungs-und Finanz AG: *See—*
Diesner, Ferdinand, 4,027,703.

Jalics, George, to Goodyear Tire & Rubber Company, The. Alpha-methyl-p-bromo-styrene and method of preparation. 4,028,486, Cl. 526-293.000.

James, Rex L.: *See—*
Olander, Emil Edward, Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,028,538.

Janome Sewing Machine Co. Ltd.: *See—*
Niikura, Masakatsu, 4,027,610.

Jansen, Friedrich Ludwig; Gerritsen, Frederik Hendrik; and Glashorster, Johan Hendrik Adolph, to U.S. Philips Corporation. Method of and device for testing hermetically enclosed reed contacts. 4,028,615, Cl. 324-28.0RS.

Jansson, Stig, to Gotaverken Angteknik AB. Means for governing the air supply to a furnace. 4,027,604, Cl. 110-182.500.

Japan Synthetic Rubber Co., Ltd.: *See—*
Yoshida, Yoshinori; and Yamamoto, Yoshiro, 4,028,424.

Jarque, Ricardo Granados; Cartes, Juan Bosch; Cabiro, Jorge Canals; Roldan, Cristobal Martinez; and Peinado, Rabadan, to Laboratorios Made, S.A. The compound 1,3,4-trimethyl-1-(3,4,5-trimethoxybenzyl)-1,2,5,6-tetrahydropyridine chloride. 4,028,371, Cl. 260-297.00R.

Jarvis Products Corporation: *See—*
Kendzior, Leo J., 4,027,390.

Jelling, Murray; Kahn, Alexander; Moore, Ernest George; and Friedman, Michael, to U.S. Dynamics Corporation, a part interest. Floating hook arrangement for an apparatus for bagging garments. 4,027,461, Cl. 53-241.000.

Jendrzey, Wolfram: *See—*
Beumer, Bernhard; and Jendrzey, Wolfram, 4,027,805.

Jenoptik Jena G.m.b.H.: *See—*
Amon, Georg, 4,027,976.

Jeter, Sheldon M., to Milliken Research Corporation. Loop forming chain. 4,027,792, Cl. 198-618.000.

Jikihara, Kazuo; Iori, Shinichi; Kimura, Ichiro; and Adachi, Kyoichi, to Kumiai Chemical Industry Co., Ltd. Herbicidal composition. 4,028,091, Cl. 71-94.000.

Jobsis, Adrianus C.: *See—*
Smith, Randlow; Jones, Henry B.; Jobsis, Adrianus C.; and Deloney, Hugh C., 4,028,139.

John Henry Company, The: *See—*
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John Wyeth & Brother Limited: *See—*
Cavalla, John Frederick; and Archibald, John Leheup, 4,028,352.
Cavalla, John Frederick; and Archibald, John Leheup, 4,028,365.

Johns-Manville Corporation: *See—*
Patznick, Richard Arthur; and Border, Gary Clayton, 4,028,083.

Johnson, Clavin R. Expandable tie anchor. 4,027,847, Cl. 249-190.000.
Johnson, George Verne. Sleeper/camper attachment. 4,027,911, Cl. 296-23.00H.
Johnson, James J.; and Loeber, David Y., to Loeber, David Y.; and O'Donnell, Harry B., III. Film covered cut item and process. 4,027,457, Cl. 53-23.000.
Johnson & Johnson: *See—*
Korpman, Ralf, 4,028,292.
Scrivens, George W., 4,027,665.
Johnston, Donald Leroy; Perkins, Manuel Garfield; and Youngberg, Lynn Zaugg, to American Hospital Supply Corporation. Destructible Luer lock syringe and method of destructing same. 4,027,669, Cl. 128-218.00N.
Johnston, Jonathan A., to Gates Rubber Company, The. Method for curing elastomeric articles. 4,027,543, Cl. 74-231.00R.
Johnston, Lyman Clarke. Exercising apparatus. 4,027,876, Cl. 272-133.000.
Johnston, Roger L.; and Wiencek, Daniel C., to Bucyrus-Erie Company. Outrigger system for vehicles. 4,027,801, Cl. 212-145.000.
Jolly, Robert, to United Kingdom Atomic Energy Authority. Welding jigs. 4,027,868, Cl. 269-266.000.
Jones, Clarence O., Jr., to Niagara Machine & Tool Works. Rake angle control for shears and the like. 4,027,567, Cl. 83-624.000.
Jones, Clyde B. Sailboat construction. 4,027,614, Cl. 114-163.000.
Jones, David A., Jr.; Schlatter, James M.; Mikulec, Richard A.; Reuter, Judith A.; and Mazur, Robert H., to G. D. Searle & Co. 2 and 3-substituted enkephalins. 4,028,319, Cl. 260-112.50R.
Jones, Henry B.: *See—*
Smith, Randlow; Jones, Henry B.; Jobsis, Adrianus C.; and Deloney, Hugh C., 4,028,139.
Jones, John L.: *See—*
Rubino, Andrew M.; Jones, John L.; and Bretschneider, Edward S., 4,028,390.
Jones, Robert A.: *See—*
United States of America, National Aeronautics and Space Administration; Creel, Theodore R., Jr.; Jones, Robert A.; Corwin, Richard R.; and Kramer, Joseph S., 4,027,524.
Jordan, William E., to Xerox Corporation. Tracking assembly for an endless belt electrostatic reproduction machine. 4,027,966, Cl. 355-16.000.
Joslyn, Gerald L.: *See—*
Rahman, Habibur; and Joslyn, Gerald L., 4,027,547.
Jost, Gerhard; Rothgordt, Ulf; and Witter, Klaus, to U.S. Philips Corporation. Method of and device for electrostatic printing. 4,028,711, Cl. 346-153.000.
Jouffret, Michel, to Rhone-Poulenc Industries. Process for the preparation of hex-2-enal. 4,028,420, Cl. 260-601.00R.
Jourdan, Francis; Couderc, Georges; and Ediar, Serge, to Thomson-CSF. Radiant energy detection system. 4,028,544, Cl. 250-203.00R.
Joy, Richard C.; Magdo, Ingrid E.; and Phillips, Alfred, Jr., to International Business Machines Corporation. Field effect transistor having improved threshold stability. 4,028,717, Cl. 357-23.000.
Julia, Marc, to Agence Nationale de Valorisation de la Recherche (ANVAR). Olefinic sulfones. 4,028,422, Cl. 260-607.0AR.
Jullien, Rene; Perona, Maurice; and Venot, Robert, to Commissariat a l'Energie Atomique. System for the heat insulation of horizontal closure surfaces for a liquid metal cooled nuclear reactor. 4,028,178, Cl. 176-38.000.
Jungers Verkstads AB of Goteborg: *See—*
Lundstrom, Bengt, 4,028,051.
Junkers, John K. Hydraulic wrench. 4,027,561, Cl. 81-57.390.
K. Loepfe Automation AG: *See—*
Stepan, Jiri, 4,027,557.
K. R. Komarek, Inc.: *See—*
Komarek, Karl R., 4,028,035.
Kablaoui, Mahmoud S.; Reid, Robert E.; and Godfrey, Arthur W., to Texaco Inc. Alkylene oxide adducts of phosphosulfurized N-(hydroxyalkyl) alkenylsuccinimides. 4,028,258, Cl. 252-46.700.
Kabushiki Kaisha Daini Seikosha: *See—*
Nemoto, Hideo; and Koike, Yuuji, 4,027,936.
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Sakai, Shuzo, 4,028,186.
Kabushiki Kaisha Komatsu Seisakusho: *See—*
Ito, Terukazu; Nakao, Kiyoharu; Minami, Teruo; and Uenoyama, Masaru, 4,027,554.
Kabushiki Kaisha Shinko Seisakusho: *See—*
Yamaura, Yoshitomo; Kobayashi, Takayoshi; Asanuma, Akira; and Miyazawa, Kuichiro, 4,028,510.
Kabushiki Kaisha Token Kikai Seisakusho: *See—*
Yahara, Satoshi, 4,027,564.
Kabushiki Kaisha Toyota Chuo Kenkyusho: *See—*
Mizutani, Yoshiyuki; Tada, Masaaki; and Imada, Yasuo, 4,028,097.
Kaeser, Arthur L.: *See—*
Parker, Richard W.; and Kaeser, Arthur L., 4,027,788.
Kahan, Frederick M.: *See—*
Kollonitsch, Janos; and Kahan, Frederick M., 4,028,405.
Kahn, Alexander: *See—*
Jelling, Murray; Kahn, Alexander; Moore, Ernest George; and Friedman, Michael, 4,027,461.
Kahn, David; and Peiffer, Howard Richard, to AMP Incorporated. Relay contact protector. 4,028,591, Cl. 361-11.000.
Kahn, Henry; and Schall, William L., to Hooker Chemicals & Plastics Corporation. Process for the bulk polymerization of vinyl halide polymers showing reduced reactor scale formation. 4,028,329, Cl. 260-42.530.
Kaiser Aluminum & Chemical Corporation: *See—*
Dorsey, Geoffrey A., Jr., 4,028,205.
Kajan Specialty Company, Inc.: *See—*
Perkins, Lee E., 4,027,732.
Kakei, Masanori: *See—*
Matsuo, Tadao; Miura, Minoru; Mashimo, Satoshi; Kakei, Masanori; and Mishima, Kyoichi, 4,028,316.
Kakitani, Haruaki; Maekawa, Masao; and Kokubo, Takashi, to Mitsubishi Monsanto Chemical Company. Process for preparing a highly expanded polyvinyl chloride foam product. 4,028,449, Cl. 264-45.300.
Kalopissis, Gregoire: *See—*
Boudouris, Georges; Kalopissis, Gregoire; Leveque, Jean-Luc; and Roussopoulos, Paul, 4,028,518.
Kamada, Naoki; and Hasebe, Nobutoshi, to Hitachi, Ltd. Intake air heating device for use in internal combustion engine. 4,027,642, Cl. 123-122.00G.
Kamatani, Yoshio; Okazaki, Hisayoshi; Imai, Ko; Fujita, Noriaki; Yamazaki, Yoshio; and Ogino, Katsuhiko, to Takeda Chemical Ind., Ltd. Method for producing L(+)-tartaric acid. 4,028,185, Cl. 195-30.000.
Kamath, G. Sanjiv; and Smith, Bradley W., to Hughes Aircraft Company. Liquid phase epitaxial process for growing semi-insulating GaAs layers. 4,028,147, Cl. 148-171.000.
Kamo, Tomoichi; and Yamane, Mikiya, to Hitachi, Ltd. Ionization detector utilizing electric discharge. 4,028,617, Cl. 324-33.000.
Kamp, Heinz, to W. Schlafhorst & Co. Method and device for cleansing spinning turbines of a spinning machine. 4,028,136, Cl. 134-8.000.
Kamyr Aktiebolag: *See—*
Richter, Johan C. F. C., 4,028,171.
Kanai, Shyuji: *See—*
Hirakawa, Seishiro; Kanai, Shyuji; Ikeda, Matsuo; and Hirata, Toshinori, 4,028,211.
Kanda, Yozo: *See—*
Migitaka, Masatoshi; and Kanda, Yozo, 4,028,718.
Kando, Akiyoshi; and Kindai, Ryoichi, to Yoshida Kogyo Kabushiki Kaisha. Element rows coupling tool for a concealed slide fastener. 4,027,369, Cl. 29-766.000.
Kando Incorporated: *See—*
Krofchalk, Gary F.; and Dodds, Andrew D., 4,027,889.
Kane, Thomas J.; and Dennie, Richard H., to Xerox Corporation. Developing system for electrostatic reproduction machines. 4,027,621, Cl. 118-5.000.
Kanezaki, Kenji, to Maruzen Oil Co. Ltd. Process for preparing p-vinylphenol polymer. 4,028,340, Cl. 260-47.0UA.
Kangol Magnet Limited: *See—*
Hart, John Michael; and Varah, James Shadrach, 4,027,362.
Kannapell, David H., to American Air Filter Company, Inc. Damper assembly for high temperature or corrosive gases. 4,027,654, Cl. 126-285.00R.
Kanon Kabushiki Kaisha: *See—*
Kawamura, Masaharu; Sakurada, Nobuaki; Shinoda, Nobuhiko; Ito, Tadashi; Ito, Fumio; and Murakami, Hiroyashu, 4,028,712.
Kantelberg, Adrianus Hubertus; and Valkestijn, Leonardus Albertus Antonius, to U.S. Philips Corporation. Circuit for generating a correction current for correcting for deflection errors on the display screen of a color television display tube. 4,028,585, Cl. 315-371.000.
Kao Soap Co., Ltd.: *See—*
Murata, Moriyasu; Sai, Fumio; and Fujino, Takashi, 4,028,280.
Murata, Moriyasu; Sai, Fumio; and Fujino, Takashi, 4,028,283.
Karabinos, Joseph V.: *See—*
Karsten, Kenneth S.; and Karabinos, Joseph V., 4,028,394.
Karami, Hamzeh, to Colgate-Palmolive Company. Absorbent article with improved pad and method. 4,027,672, Cl. 128-284.000.
Karl Mengele & Sohne: *See—*
Grimm, Klaus; and Mengele, Alois, deceased, 4,027,826.
Karsten, Kenneth S.; and Karabinos, Joseph V., to R. T. Vanderbilt Company, Inc. Antibacterial and fungicidal S-phenylthiocarbamates. 4,028,394, Cl. 260-455.00A.
Kartzmark, Robert: *See—*
MacDonald, John M.; and Kartzmark, Robert, 4,028,224.
Kasenga, Anthony F., to Honeywell Inc. Stoichiometric annealing of mercury cadmium telluride. 4,028,145, Cl. 148-20.300.
Kashio, Toshio, to Casio Computer Co., Ltd. Apparatus for confirming the correct impression of printing characters. 4,027,764, Cl. 197-49.000.
Kashiwada, Toshinobu: *See—*
Okumura, Osamu; Sakatani, Takenobu; Yamane, Izumi; and Kashiwada, Toshinobu, 4,028,282.
Kason Hardware Corporation: *See—*
Berkowitz, Irving L., 4,027,987.
Kastalon Inc.: *See—*
De Ment, Robert B.; and Simms, William D., 4,027,513.
Kaswan, Joseph. Tobacco product. 4,027,679, Cl. 131-9.000.
Kataoka, Takashi: *See—*
Nakasuji, Norikazu; Kataoka, Takashi; Inagaki, Hiroshi; and Nakashima, Sunao, 4,028,118.
Kato, Fumio: *See—*
Kuroda, Michio; Namura, Kiyoshi; Kato, Fumio; Yamazaki, Yoshiaki; Iwasaki, Tutomu; Ishida, Akira; Sohma, Akio; and Imai, Tetsu, 4,028,006.

Kato, Hideo: *See*—
Fujisawa, Michio; Matsumoto, Hatsuo; Sawada, Shuzo; Yamane, Kiyoshi; Kato, Hideo; Shimizu, Takayuki; and Kato, Shigeo, 4,027,345.

Kato, Motohiko: *See*—
Ishiyama, Jiro; Kato, Motohiko; Yoshida, Fumihiko; and Yokotsuka, Tamotsu, 4,028,184.

Kato, Shigeo: *See*—
Fujisawa, Michio; Matsumoto, Hatsuo; Sawada, Shuzo; Yamane, Kiyoshi; Kato, Hideo; Shimizu, Takayuki; and Kato, Shigeo, 4,027,345.

Katsube, Toyonari. Golf swing timing device. 4,027,886, Cl. 273-186.00A.

Katzakian, Arthur, Jr.; and DePree, David O., to Aerojet-General Corporation. Buffering agents. 4,028,234, Cl. 210-37.00R.

Katzman, Allison W.: *See*—
Barlow, Gordon A.; and Katzman, Allison W., 4,027,423.

Kawaguchi, Hiroshi: *See*—
Nakamura, Hiroyuki; Kawaguchi, Hiroshi; and Nishiwaki, Kiyoshi, 4,028,658.

Kawaharazaki, Takashi: *See*—
Shimogawa, Toshiaki; Morita, Masayuki; and Kawaharazaki, Takashi, 4,027,905.

Kawamoto, Kyoji; and Ishihara, Yosuke, to Sumitomo Electric Industries, Ltd. Floating disc brake including air escape structure. 4,027,750, Cl. 188-73.300.

Kawamura, Masaharu; Sakurada, Nobuaki; Shinoda, Nobuhiko; Ito, Tadashi; Ito, Fumio; and Murakami, Hiroyashu, to Kanon Kabushiki Kaisha. Display system for photographic camera. 4,028,712, Cl. 354-23.00D.

Kawarai, Takashi; Sawada, Yuji; Takemoto, Katsumi; and Mikami, Sadao, to Mitsubishi Jukogyo Kabushiki Kaisha. Loading-unloading apparatus for a vehicle. 4,027,823, Cl. 214-38.0CA.

Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Ikeda, Tsunemi; and Sezaki, Tamotsu, 4,027,617.

Kawasaki, Kaoru; Sakano, Takeshi; Furuya, Shigeru; and Endo, Shigeru, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Mechanism for assembling ship's hull. 4,027,803, Cl. 214-1.00H.

Kawawa, Takaho; and Ito, Masaharu, to Nippon Kokan Kabushiki Kaisha. Big-end-down ingot mold for casting metal. 4,027,844, Cl. 249-111.000.

Kaye, Wilbur I., to Beckman Instruments, Inc. Detector apparatus for laser light scattering photometers. 4,027,973, Cl. 356-73.000.

Kazigase, Masahiro: *See*—
Hirai, Masahide; Fujimura, Mikio; Kazigase, Masahiro; and Saito, Minoru, 4,028,284.

KDI Sylvan Pools, Inc.: *See*—
Silverman, Herman, 4,027,442.

Kearney & Trecker Corporation: *See*—
Zankl, Frank; Kirkham, Edward E.; Stobbe, Richard E.; and Schachte, John J., 4,028,599.

Keebler, EveLynne Marie. Convertible handbag. 4,027,710, Cl. 150-28.00A.

Keijer, Jan T., to Grasso's Koninklijke Machinefabrieken N.V. Rotary displacement compressor with capacity control. 4,028,016, Cl. 417-440.000.

Keim, Willi: *See*—
Gruber, Kurt; Keim, Willi; and Hentschel, Klaus, 4,027,688.

Kelder, Raymond: *See*—
Arbuckle, Norman B., 4,027,608.

Keller, Albert G.: *See*—
Morrison, Howard J.; and Keller, Albert G., 4,027,425.

Keller, D. V., Jr.: *See*—
Smith, Clay D.; and Keller, D. V., Jr., 4,027,731.

Keller, Herbert; Krieg, Bruno; and Romer, Ludwig, to Kraftwerk Union Aktiengesellschaft. Turbomachine, such as a steam turbine with high steam inlet temperature, especially. 4,027,996, Cl. 415-116.000.

Keller, Peter: *See*—
Alig, Leo; Furst, Andor; Keller, Peter; Muller, Marcel; Kerb, Ulrich; and Wiechert, Rudolf, 4,028,400.

Kelley, Fred William, Jr., to General Electric Company. High speed control of reactive power for voltage stabilization in electric power systems. 4,028,614, Cl. 323-102.000.

Kellis, Harry Garfield. Razor blade conditioning device. 4,027,387, Cl. 30-90.000.

Kempke, William George: *See*—
Hoffman, Roy Louis; Kempke, William George; and Soltis, Frank Gerald, 4,028,670.

Kendall Company, The: *See*—
Swallow, Roger T.; and Pendergrass, John E., 4,027,667.

Kendzior, Leo J., to Jarvis Products Corporation. Saw blade. 4,027,390, Cl. 30-355.000.

Kennecott Copper Corporation: *See*—
Ammann, Paul R.; Cook, Glenn M.; and Portal, Charles, 4,028,202.

Kennedy, Gordon F.: *See*—
Schaefer, Carl W. D.; Schaefer, Richard L.; and Kennedy, Gordon F., 4,027,862.

Kenney, Michael John, to Dunlop Limited. Lubricant container assembly. 4,027,713, Cl. 152-330.00L.

Kenworthy, John B. Baled hay loading and transport device. 4,027,773, Cl. 214-766.000.

Kerb, Ulrich: *See*—
Alig, Leo; Furst, Andor; Keller, Peter; Muller, Marcel; Kerb, Ulrich; and Wiechert, Rudolf, 4,028,400.

Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See*—
Labus, Herwig, 4,028,023.

Kerr, Alexander Fraser, to Singer Company, The. Feed mechanism for sewing machines. 4,027,609, Cl. 112-209.000.

Kerr, David L.: *See*—
Brownstein, Arthur M.; and Kerr, David L., 4,028,423.

Kerr-McGee Corporation: *See*—
Baldwin, Roger Allen; and Davis, Robert Elliott, 4,028,219.

Key, Columbus B., Jr.; and Spaulding, Vincent M. Flashlight marking implement. 4,028,540, Cl. 240-6.460.

Keystone Lamp Manufacturing Corporation: *See*—
Oster, Joseph, 4,028,543.

Kidd, Robert P.: *See*—
Branch, William C.; Cole, Oliver W.; and Kidd, Robert P., 4,027,783.

Kieffer, Vernon E.; and Damon, Billy L., to Emerson Electric Co. Self locking molded thermostat strap. 4,028,570, Cl. 310-68.00C.

Kiener, Karl. Process and apparatus for the production of combustible gas. 4,028,068, Cl. 48-209.000.

Kierstead, Richard Wightman: *See*—
Guthrie, Robert William; and Kierstead, Richard Wightman, 4,028,397.

Kikkawa, Seiichi: *See*—
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Kikkoman Shoyu Co., Ltd.: *See*—
Hayashi, Kazuya; Mizunuma, Takeji; and Yokotsuka, Tamotsu, 4,028,470.
Ishiyama, Jiro; Kato, Motohiko; Yoshida, Fumihiko; and Yokotsuka, Tamotsu, 4,028,184.

Kikuchi, Shoji: *See*—
Hori, Haruo; Kikuchi, Shoji; Wada, Hajime; Kobayasi, Sadatosi; and Endo, Takaya, 4,028,106.

Kilpatrick, William L.: *See*—
Berkowitz, Benjamin; Luedtke, Arthur; Kilpatrick, William L.; and Bentley, William F., Jr., 4,028,709.

Kilroy, Eugene Joseph, Jr.; Crain, Philip Warren; and Woods, James Frank, to Mattel, Inc. Multi-structure animated amusement device. 4,027,424, Cl. 46-116.000.

Kilvert, Charles A. Method of mounting a candle. 4,028,046, Cl. 431-297.000.

Kim, Han J.; and Reid, F. Joseph, to GTE Laboratories Incorporated. Silver-cadmium oxide alloys. 4,028,061, Cl. 75-233.000.

Kim, Han J.; and Reid, F. Joseph, to GTE Laboratories Incorporated. Compacts for preparing silver-cadmium oxide alloys. 4,028,063, Cl. 75-233.000.

Kim, Oh-Kil, to United States of America, Navy. Vinyl polymerization initiator and reducing agent. 4,028,270, Cl. 252-428.000.

Kimball, Stephen F.: *See*—
Gates, Paul E.; Kimball, Stephen F.; and Leadvaro, Stephen J., 4,028,577.

Kimura, Akio: *See*—
Seki, Kenji; Kimura, Akio; Asahi, Satoshi; and Takeshita, Yasuhiro, 4,028,435.
Tsuchiya, Hiroshi; Mukai, Kunio; Kimura, Akio; Taya, Hiroshi; Fujimoto, Keimei; Ozaki, Toshiaki; Yamamoto, Sigeo; Ogawa, Taizo; Ooishi, Tadashi; and Okuno, Yositosi, 4,028,438.

Kimura, Ichiro: *See*—
Jikihara, Kazuo; Iori, Shinichi; Kimura, Ichiro; and Adachi, Kyoichi, 4,028,091.

Kimura, Shigeru: *See*—
Tashiro, Minoru; and Kimura, Shigeru, 4,028,611.

Kindai, Ryoichi: *See*—
Kando, Akiyoshi; and Kindai, Ryoichi, 4,027,369.

Kine, Masayoshi, to Shimano Industrial Company, Limited. Center-pull type caliper brake for a bicycle. 4,027,746, Cl. 188-24.000.

Kinemetrics, Inc.: *See*—
Rihn, William J., 4,028,659.

King, Alan G.; and Levine, Leon. Composite dental material and method of preparing same. 4,028,325, Cl. 260-42.150.

King, Harry J., to Hughes Aircraft Company. High current density ion source. 4,028,579, Cl. 313-361.000.

King, Henry L., to Monsanto Company. Fire retardant polyester fibers. 4,028,330, Cl. 260-45.70P.

King, Jerry A., to United Technologies Corporation. Apparatus for delivering particulate material at a selected rate. 4,027,790, Cl. 222-285.000.

King, William James. Method for cool deposition of layers of materials onto a substrate. 4,028,206, Cl. 204-192.00C.

Kingsley, Ernest James; and Mendgen, Horst Guenter, to Zygon Industries Limited. Fence post assembly. 4,027,856, Cl. 256-47.000.

Kircher, Morton S., to Olin Corporation. Connection means for anode posts in electrolytic diaphragm cells. 4,028,210, Cl. 204-266.000.

Kirkham, Edward E.: *See*—
Zankl, Frank; Kirkham, Edward E.; Stobbe, Richard E.; and Schachte, John J., 4,028,599.

Kirkpatrick, David H.: *See*—
Evans, Kenneth W.; Howlett, Mason M.; and Kirkpatrick, David H., 4,027,755.

Kirsch, Lawrence J. Instrument panel. 4,027,620, Cl. 116-129.00T.

Kish, Edward E.: *See*—
Shufflebarger, Earl D.; Kish, Edward E.; Boylan, John R.; Diehl, George D.; Gallagher, Bernard J.; and Tobbe, William P., 4,028,254.

Kish, Edward E., Jr.: *See*—
Murauskas, Donald J.; Kish, Edward E., Jr.; Cunningham, Frank M.; Gallagher, Bernard J.; and Shufflebarger, Earl D., 4,028,248.

Kishimoto, Yasushi: *See*—
Ogawa, Shinsaku; Ide, Akira; Komatsu, Kazurou; Matsumoto, Sojiro; and Kishimoto, Yasushi, 4,028,392.

Kiss, Sandor G. Jet flow alternator. 4,027,407, Cl. 37-61.000.

Kitagawa, Junji; and Akita, Sigeyuki, to Nippon Soken, Inc. Electrical wiring system for selectively actuating electrical loads. 4,028,620, Cl. 324-51.000.

Kitazawa Shoji Kabushiki Kaisha: *See*—
Nomura, Chifuru, 4,027,576.

Klautschek, Herwig: *See*—
Blaschke, Felix; and Klautschek, Herwig, 4,028,600.

Klebba, Horst, to Volkswagenwerk Aktiengesellschaft. Door arrangement for a vehicle. 4,027,432, Cl. 49-503.000.

Klein, Gunter, to GESIPA Blindniettechnik Gesellschaft mit beschrankter Haftung. Blind riveter with automatic rivet feed. 4,027,520, Cl. 72-391.000.

Klein, Gunther; and Spohr, Karl, to GESIPA Blindniettechnik Gesellschaft mit beschrankter Haftung. Manual blind riveting tool. 4,027,556, Cl. 81-3.00R.

Kleinschmidt, Roger F.; and Campbell, Robert W., to Phillips Petroleum Company. Transparent polyamide armor. 4,028,476, Cl. 428-220.000.

Knapp, Philip B., to Minnesota Mining and Manufacturing Company. Planter apparatus. 4,027,606, Cl. 111-77.000.

Knappstein, Johannes: *See*—
Bender, Martin; Knappstein, Johannes; and Stratmann, Josef, 4,028,192.

Knutti, Dietrich: *See*—
Zinsstag, Christoph; Kutschera, Heinz; and Knutti, Dietrich, 4,028,239.

Kobayashi, Daisaku: *See*—
Takeuchi, Hiroshi; Ishizawa, Toshitugu; Yamano, Tetuyuki; Chiba, Ko; and Kobayashi, Daisaku, 4,028,022.

Kobayashi, Gai; Shikano, Yoshiro; and Yano, Masao, to Mitsubishi Denki Kabushiki Kaisha. Vapor cooling device for semiconductor device. 4,027,728, Cl. 165-105.000.

Kobayashi, Shoichi: *See*—
Ueshima, Takashi; Tanaka, Yasuzi; and Kobayashi, Shoichi, 4,028,482.

Kobayashi, Takashi, to Yamaha Hatsudoki Kabushiki Kaisha. V-belt variable-speed drive. 4,027,544, Cl. 74-230.17E.

Kobayashi, Takayoshi: *See*—
Yamaura, Yoshitomo; Kobayashi, Takayoshi; Asanuma, Akira; and Miyazawa, Kuichiro, 4,028,510.

Kobayasi, Sadatosi: *See*—
Hori, Haruo; Kikuchi, Shoji; Wada, Hajime; Kobayasi, Sadatosi; and Endo, Takaya, 4,028,106.

Kobiske, Gerald F., to Kobiske Industries, Inc. Manure pump having agitator piston. 4,028,017, Cl. 417-489.000.

Kobiske Industries, Inc.: *See*—
Kobiske, Gerald F., 4,028,017.

Koch, Robert E., to General Electric Company. Electrical current limiting fuse with bound sand filler and improved low current fault clearing. 4,028,655, Cl. 337-160.000.

Kodo, Masatsugu: *See*—
Uchii, Jiro; Kodo, Masatsugu; Soga, Tsunehiko; and Morimoto, Yutaka, 4,028,070.

Koerner, Gotz: *See*—
Fink, Hans-Ferdi; Fritsch, Herwig; Koerner, Gotz; Rossmy, Gerd; and Schmidt, Gunter, 4,028,218.

Koga, Koichi: *See*—
Hotta, Seiji; Koga, Koichi; Bando, Tomoyuki; and Kondo, Yutaka, 4,028,331.

Kogaku Ltd.: *See*—
Fukushige, Tatsuzo, 4,027,942.

Koike, Yuuji: *See*—
Nemoto, Hideo; and Koike, Yuuji, 4,027,936.

Kokubo, Takashi: *See*—
Kakitani, Haruaki; Maekawa, Masao; and Kokubo, Takashi, 4,028,449.

Kokurin, Vyacheslav Alexandrovich; Bakulov, Igor Alexeevich; and Kotlyarov, Vitaly Mikhailovich. Method of thermal disinfection of sewage and plant realizing same. 4,028,242, Cl. 210-71.000.

Kokusai Denshin Denwa Kabushiki Kaisha: *See*—
Niiro, Yasuhiko, 4,028,644.

Kokusai Gijutsu Kaihatsu Kabushiki Kaisha: *See*—
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Kolar, Miloslav: *See*—
Safar, Petr; Langr, Josef; Kolar, Miloslav; and Nosek, Stanislav, 4,027,705.

Kollonitsch, Janos; and Kahan, Frederick M., to Merck & Co., Inc. Fluorinated amino acids. 4,028,405, Cl. 260-534.00C.

Kolman, Philip; Dunn, Maurice J.; and Tiersten, David. Method of simultaneously counting blood cells. 4,027,971, Cl. 356-36.000.

Komarek, Karl R., to K. R. Komarek, Inc. Frameless briquetting machine. 4,028,035, Cl. 425-363.000.

Komarniski, John Victor. Multiple chemistry analyzer. 4,027,979, Cl. 356-180.000.

Komatsu, Kazurou: *See*—
Ogawa, Shinsaku; Ide, Akira; Komatsu, Kazurou; Matsumoto, Sojiro; and Kishimoto, Yasushi, 4,028,392.

Komatsu, Yasutoshi; and Yanagisawa, Yuzuru, to Sony Corporation. Surface acoustic wave filter. 4,028,649, Cl. 333-72.000.

Komoto, Hiroshi: *See*—
Doi, Tsunesuke; Komoto, Hiroshi; Chono, Masazumi; Inoue, Akira; Saito, Kazuaki; and Shinozuka, Isao, 4,028,055.

Kondo, Toshiyuki, to Aisin Seiki Kabushiki Kaisha. Anti-skid brake control device for vehicles. 4,027,924, Cl. 303-92.000.

Kondo, Yutaka: *See*—
Hotta, Seiji; Koga, Koichi; Bando, Tomoyuki; and Kondo, Yutaka, 4,028,331.

Konishi, Yoshihiro; Konno, Kenichi; Yazawa, Norihiko; and Hoshino, Norio, to Nippon Hoso Kyokai. Microwave circuits constructed inside a waveguide. 4,028,650, Cl. 333-73.00W.

Konishiroku Photo Industry Co., Ltd.: *See*—
Hori, Haruo; Kikuchi, Shoji; Wada, Hajime; Kobayasi, Sadatosi; and Endo, Takaya, 4,028,106.

Konno, Kenichi: *See*—
Konishi, Yoshihiro; Konno, Kenichi; Yazawa, Norihiko; and Hoshino, Norio, 4,028,650.

Konter, Wolfgang; Witte, Josef; Vehlewald, Peter; and Block, Hans-Dieter, to Bayer Aktiengesellschaft. Graft polymers of vinyl phosphonic acid esters. 4,028,434, Cl. 260-874.000.

Koprowski, Hilary: *See*—
Kritchevsky, David; Koprowski, Hilary; and Makolska, Hanna, 4,028,469.

Korfil, Incorporated: *See*—
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Koritsu Kikaikogyo Co., Ltd.: *See*—
Nagayoshi, Konno, 4,028,193.

Korl, Peter: *See*—
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Korpman, Ralf, to Johnson & Johnson. Hot melt adhesive. 4,028,292, Cl. 260-27.00R.

Koski, Kaijo Aatto Matias: *See*—
Christell, Adolf Ragnar Roland Umberto Einarsson; Koski, Kaijo Aatto Matias; and Ljunggren, Knut Lennart, 4,028,267.

Kotche, Ervin, to Kotche, Ervin H. Cleaning pad. 4,027,350, Cl. 15-104.930.

Kotche, Ervin H.: *See*—
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Kotlyarov, Vitaly Mikhailovich: *See*—
Kokurin, Vyacheslav Alexandrovich; Bakulov, Igor Alexeevich; and Kotlyarov, Vitaly Mikhailovich, 4,028,242.

Kotzsch, Hans-Joachim: *See*—
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Kovacs, Bela V.: *See*—
Cole, Gerald S.; Kovacs, Bela V.; Sensoli, Robert A.; and Smartt, Herschel B., 4,028,099.

Kraftwerk Union Aktiengesellschaft: *See*—
Keller, Herbert; Krieg, Bruno; and Romer, Ludwig, 4,027,996.

Krall, James W.: *See*—
Guenther, Robert O.; Huffhines, Donald F.; Krall, James W.; and Ray, Charles D., 4,027,616.

Kramer, Joseph S.: *See*—
United States of America, National Aeronautics and Space Administration; Creel, Theodore R., Jr.; Jones, Robert A.; Corwin, Richard R.; and Kramer, Joseph S., 4,027,524.

Kramer, Petrus A.: *See*—
van den Brink, Marinus J.; Austermuhle-Bertola, Helena; and Kramer, Petrus A., 4,028,418.

Kramer, Richard W. Low well yield control system. 4,028,011, Cl. 417-278.000.

Kramer, Wolfgang; Draber, Wilfried; Timmler, Helmut; and Forster, Heinz, to Bayer Aktiengesellschaft. Process for the preparation of α-oxothiodimethylamide compounds. 4,028,409, Cl. 260-551.00S.

Krandex Corporation: *See*—
Slingluff, Eugene L., 4,027,659.

Kraupa, Werner, to Siemens Aktiengesellschaft. Nuclear reactor installation. 4,028,176, Cl. 176-38.000.

Kraus, Heinz, to Loewe-Opta GmbH. Arrangement for varying the excitation of a deflection circuit in response to load changes and the like. 4,028,588, Cl. 315-387.000.

Krauss-Maffei Aktiengesellschaft: *See*—
Lang, Andreas, 4,027,597.

Krauss, Timothy A., to United Technologies Corporation. Torsionally compliant helicopter rotor blade with improved stability and performance characteristics. 4,028,003, Cl. 416-141.000.

Krebs, Gerd: *See*—
Eichholz, Werner; and Krebs, Gerd, 4,028,169.

Krenzer, John, to Velsicol Chemical Corporation. Thiadiazolylimidazolidinones. 4,028,375, Cl. 260-306.80D.

Krieg, Bruno: *See*—
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Kritchevsky, David; Koprowski, Hilary; and Makolska, Hanna. Bread containing alfalfa. 4,028,469, Cl. 426-551.000.

Krofchalk, Gary F.; and Dodds, Andrew D., to Kando Incorporated. Stair-climbing carrier. 4,027,889, Cl. 280-5.220.

Krohn, David A.; Grolman, Bernard; and Siegmund, Walter P., to American Optical Corporation. Method of making artificial intraocular lenses with holes. 4,028,082, Cl. 65-23.000.

Kroposki, Lorraine M.; Yoshimine, Masao; and Freedman, Harold H., to Dow Chemical Company, The. Process for preparing phosphorothioates and phenylphosphonothioates. 4,028,439, Cl. 260-973.000.

Krum, Jack Kern; Wollermann, Louis Albert; and Rucker, Dugan

Allan, to International Telephone and Telegraph Corporation. Yeast leavened dough composition. 4,028,471, Cl. 426-22.000.
Krupka, Yaakov: *See—*
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Ku, San-Mei: *See—*
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Kugelmann, Adolf: *See—*
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Kuhnelt, Herbert; and Huber, Rudolf, to Hoerbiger Fluidtechnik KG. Pneumatic pulse hydraulic controlled valve for controlling a lubricating device. 4,027,744, Cl. 184-7.00F.
Kulker, Otto, to Westfalia Separator AG. Self-cleaning centrifugal drum for the periodical removal of a portion of the solids separated from a liquid and collecting in the peripheral part of the interior of the drum. 4,027,820, Cl. 233-20.00A.
Kum, Dong Woo. Joint connector for bars. 4,027,988, Cl. 403-218.000.
Kumar, Narayan Ganesh: *See—*
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Kumasaka, Kazuhiro: *See—*
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Kumiai Chemical Industry Co., Ltd.: *See—*
Jikihara, Kazuo; Iori, Shinichi; Kimura, Ichiro; and Adachi, Kyoichi, 4,028,091.
Kummer, Horst: *See—*
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Kumpfer, Beverly D.: *See—*
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Kunesh, John G.: *See—*
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Kunihiro, Toshiro: *See—*
Funamo, Hiroshi; Kunihiro, Toshiro; and Murai, Masaaki, 4,028,495.
Kunkel, Heinrich; Brandenstein, Manfred; Olschewski, Armin; Finzel, Sigismund; Gossmann, Willi; and Horling, Peter, to SKF Industrial Trading and Development Company B.V. Clutch release bearing. 4,027,932, Cl. 308-233.000.
Kuntz, Ronald W. Pace setting light for joggers. 4,028,693, Cl. 340-323.00R.
Kunz, Harold Russell, to United Technologies Corporation. Support material for a noble metal catalyst and method for making the same. 4,028,274, Cl. 252-447.000.
Kurahashi, Suminobu: *See—*
Sato, Shigetake; Kurahashi, Suminobu; Okuyama, Toru; and Hamada, Noboru, 4,028,287.
Kuraray Co., Ltd.: *See—*
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Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
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Kuroda, Michio; Namura, Kiyoshi; Kato, Fumio; Yamazaki, Yoshiaki; Iwasaki, Tutomu; Ishida, Akira; Sohma, Akio; and Imai, Tetsu, to Hitachi, Ltd. Bucket cover attachment. 4,028,006, Cl. 416-191.000.
Kurtz, Donald R.; Popadick, Carl C.; Sofianek, Joseph C.; and Talento, Joseph L., to General Electric Company. High current vacuum circuit interrupter with beryllium contact. 4,028,514, Cl. 200-144.00B.
Kushida, Toshimoto; and Logothetis, Eleftherios M., to Ford Motor Company. Circuit for converting a temperature dependent input signal to a temperature independent output signal. 4,028,642, Cl. 323-75.00B.
Kuster, Heinz: *See—*
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Kutschera, Heinz: *See—*
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Kvaerner Brug A/S: *See—*
Fagerhaug, Bjorn; and Oberg, Karl, 4,028,189.
Kwast, Theodore Emil; and Smith, Gordon Marlon, to Singer Company, The. Flange spreader. 4,027,373, Cl. 29-256.000.
Kyodo Chemical Company, Ltd.: *See—*
Hotta, Seiji; Koga, Koichi; Bando, Tomoyuki; and Kondo, Yutaka, 4,028,331.
Kyodo Denshi Kogyo Co., Ltd.: *See—*
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Kyorin Pharmaceutical Co., Ltd.: *See—*
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La Telemecanique Electrique: *See—*
Bouteille, Daniel; Hardouin, Pierre; and Thomasse, Andre, 4,027,692.
Labedan, Pierre; Mugnier, Robert; and Chavanel, Hubert, to Rhone-Pouleno. Electrolysis cell. 4,028,209, Cl. 204-252.000.
LaBelle, Harold E., Jr.; and Cronan, Charles J., to Tyco Laboratories, Inc. Multiple dies for ribbon. 4,028,059, Cl. 23-273.0SP.
Laboratorios Made, S.A.: *See—*
Jarque, Ricardo Granados; Cartes, Juan Bosch; Cabiro, Jorge Canals; Roldan, Cristobal Martinez; and Peinado, Rabadan, 4,028,371.
Labus, Herwig, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Fluid operable rotary piston device. 4,028,023, Cl. 418-108.000.
Ladney, Michael, Jr.: *See—*
Foster, Edwin E.; and Foster, Thomas E., 4,027,919.
Ladrigan, J. William, to Xerox Corporation. Transfer system for electrostatic reproduction machine. 4,027,960, Cl. 355-3.00R.
Laferty, John M., Jr.; Rittko, Joseph E.; and Port, David J., to GTE Sylvania Incorporated. Free flowing powder and process for producing it. 4,028,095, Cl. 75-.5AB.
Laitram Corporation, The: *See—*
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LaJovic, Dusan S., to Colgate-Palmolive Company. Method for protectively covering container necks. 4,028,459, Cl. 264-159.000.
LaMarche, Robert Ernest; May, Carl Jerome, Jr.; and Zebo, Timothy James, to Bell Telephone Laboratories, Incorporated. Digital speech detector. 4,028,496, Cl. 179-15.0AS.
Lamberts, Robert L.; and Nail, Nelson R., to Eastman Kodak Company. Photographic transparency for producing a lenticular array. 4,028,109, Cl. 96-116.000.
Lamburn, Alan Salisbury: *See—*
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Lampe, Wolfgang: *See—*
Carlsson, Tage; and Lampe, Wolfgang, 4,028,653.
Lampl, Friedrich; and Paul, Thomas Campbell, to Dowty Meco Limited. Scraper chain conveyor. 4,027,793, Cl. 198-719.000.
Lang, Andreas, to Krauss-Maffei Aktiengesellschaft. Linear induction motor with damping cage. 4,027,597, Cl. 104-148.0MS.
Langberg, Alfred M.: *See—*
Davis, Raymond R.; Langberg, Alfred M.; and Debus, Alvin P., 4,028,241.
Lange, Gerd: *See—*
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Lange, Harold Carl; and MacLeay, Ronald Edward, to Pennwalt Corporation. α-isocyanato and α-isothiocyanato azos and their derivatives. 4,028,344, Cl. 260-174.000.
Langenstuck, Alfons: *See—*
Elsner, Wolfgang; Moslener, Jorn; and Langenstuck, Alfons, 4,027,565.
Langere, Ronald Francis; and Loeffler, Otto Ernest, to NL Industries, Inc. Stabilized hydrous pentavalent antimony oxide sol composition and its production, production of dry powder from sol composition and resulting dry powder. 4,028,266, Cl. 252-313.00R.
Langford, Obie M.: *See—*
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Langlie, Howard: *See—*
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Langlois, Roland E., to Owens-Corning Fiberglas Corporation. Method for removing particulate pollutants from stack gases. 4,028,071, Cl. 55-89.000.
Langr, Josef: *See—*
Safar, Petr; Langr, Josef; Kolar, Miloslav; and Nosek, Stanislav, 4,027,705.
Lanpher, Edward J.: *See—*
Morton, Avery A.; and Lanpher, Edward J., 4,028,484.
Lantz, Charles Hunter, to B.F. Goodrich Company, The. In-axle vehicle wheel speed sensing device. 4,027,753, Cl. 188-181.00R.
Lapchenko, Alexandr Mikhailovich: *See—*
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Larin, Konstantin Leonidovich: *See—*
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Larkin, John M.: *See—*
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Larner, Douglas Stanley, to Plessey Handel und Investments A.G. Regenerative repeater circuit arrangement for use in digital data transmission systems. 4,028,559, Cl. 307-246.000.
Larson, Ivar W.: *See—*
Olander, Emil Edward, Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,028,538.
Larsson, Hans Evald. Cross-country ski having alternate sliding and holding surfaces. 4,027,895, Cl. 280-604.000.
Latva, Henry F., to Chrysler Corporation. Heat treating atmospheres. 4,028,100, Cl. 75-224.000.
Laubach, Ward E., to I-T-E Imperial Corporation. Steel arcing contact for circuit breaker. 4,028,513, Cl. 200-144.00R.
Lauzier, Rene, to Central Automobile Industry Co., Ltd., The. Guard rail. 4,027,855, Cl. 256-21.000.
Lava Crucible Refractories Company: *See—*
Miller, Eldon D.; and Washburn, Ryan F., 4,028,453.
Laverty, Richard C., to Interior Fasteners, Inc. Self-tapping screw fastener with improved thread construction. 4,027,573, Cl. 85-46.000.
Lavery, Elzie E. Combustion engine driven liquid heater. 4,027,631, Cl. 122-26.000.
Lawbaugh, J. Medley, to Raymond Lee Organization, Inc., The. Disposable ashtray liner and mating bowl. 4,027,683, Cl. 131-235.00R.
Laxague, Jean: *See—*
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Leach, George S., Jr., to Motorola, Inc. Charge coupled storage device multiplexer. 4,028,671, Cl. 340-173.00R.

Leadvaro, Stephen J.: *See—*
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Lear, Anthony: *See—*
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Leasure, William; Garcia, Luis; Reifel, Charles; and Shelton, Jack, to Mira-Pak, Inc. Method and apparatus for opening folded box blanks. 4,027,579, Cl. 93-53.00M.

Le Brasseur, Genevieve, to Societe Chimique des Charbonnages - CdF Chimie. Photodegradable polymer compositions. 4,028,480, Cl. 526-3.000.

LeBus, John W.: *See—*
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Leclair, Alain: *See—*
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Lee, Arnold S. J., to Milstein Medical Research Foundation, Inc. Automatic blood pressure recorder. 4,027,662, Cl. 128-2.05A.

Leetmaa, Juri G., to Hughes Aircraft Company. Coupled-cavity microwave filter. 4,028,651, Cl. 333-73.00W.

Legille, Edouard, to S.A. des Anciens Etablissements Paul Wurth. Improved tuyere feed device. 4,027,605, Cl. 110-182.500.

Legousse, Maurice: *See—*
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Le Roux, Herve: *See—*
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Levine, Arnold M., to International Telephone and Telegraph Corporation. Fiber optic phased array antenna system for RF transmission. 4,028,702, Cl. 343-100.0SA.

Levine, Leon: *See—*
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Levine, Richard F.: *See—*
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Levine, Robert Aaron: *See—*
Wardlaw, Stephen Clark; Levine, Robert Aaron; and Massey, James Vincent, III, 4,027,660.

Levinson, Sidney Harry; and Mendelson, Wilford Lee, to SmithKline Corporation. Novel preparation of trifluoromethylthioacetic acid. 4,028,408, Cl. 260-539.00R.

Lewin, Nathan; and Wong, Emmy Tong-In, to Bio-Rad Laboratories. Assay method for serum folate. 4,028,465, Cl. 424-1.000.

Lewis, Adolph L., to United States of America, Navy. Fiber optic cable connector. 4,027,938, Cl. 350-96.00C.

Lewis, David L.; Franks, C. Richard; and Schenker, Barry A., to Diamond Shamrock Corporation. Manganese dioxide electrode. 4,028,215, Cl. 204-290.00F.

Lewis, Edgar B., to Grumman Aerospace Corporation. High-resolution vision system. 4,028,725, Cl. 358-103.000.

LFE Corporation: *See—*
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Li, Tsi Tieh; and Saxon, Robert, to American Cyanamid Company. Vulcanizable elastomers derived from thiodiethanol. 4,028,305, Cl. 260-75.00S.

Libbey-Owens-Ford Company: *See—*
Rahrig, Donald D.; and Revells, Robert G., 4,028,086.

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Linde Aktiengesellschaft: *See—*
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Lindmayer, Joseph, to Solarex Corporation. Method of impregnating a semiconductor with a diffusant and article so formed. 4,028,151, Cl. 148-189.000.

Lindvay, Michael W., to Velsicol Chemical Corporation. Flame retardant polymeric compositions containing melamine hydrohalides. 4,028,333, Cl. 260-45.8NT.

Linnert, Peter J., to Trane Company, The. Valve plate having improved suction gas flow path. 4,027,853, Cl. 251-361.000.

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Lipa Lizenz-und Patentverwertungs-ansalt: *See—*
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Lipp, Charles E.; and Young, Teddy R., to Caterpillar Tractor Co. Method of and apparatus for semi-automatic assembly of track-type chain. 4,027,471, Cl. 59-7.000.

Lippsmeier, Bernd; Hestermann, Klaus; and Reuter, Martin, to Hoechst Aktiengesellschaft. Production of tertiary (hydroxymethyl)-methylphosphine oxides. 4,028,421, Cl. 260-606.50P.

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Litt, Morton H.; and Kumar, Narayan Ganesh, to International Playtex, Inc. Cellulose solutions and products prepared therefrom. 4,028,132, Cl. 106-163.00R.

Litton Business Systems, Inc.: *See—*
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Liu, Hsing-ching; and Liu, Lan-dih. Novel educational toy. 4,027,402, Cl. 35-9.00R.

Liu, Lan-dih: *See—*
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Livingston, Richard Donnan; and Sauerbrunn, Robert Dewey, to Du Pont de Nemours, E. I., and Company. Distillation apparatus. 4,028,443, Cl. 261-114.0TC.

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Llach, Lorenzo; and Picas, Arturo, to Canton Textile Mills, Inc. Variable speed drive system for carding machine. 4,027,358, Cl. 19-106.00R.

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Lobb, Daniel Richard, to Redifon Limited. Optical systems. 4,027,949, Cl. 350-150.000.

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Loesser, Ernest W., III. Compressible dispensing container having piercing prongs. 4,027,985, Cl. 401-134.000.

Loewe-Opta GmbH.: *See—*
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Loft, John T., to Amerace Corporation. Filtration apparatus. 4,028,250, Cl. 210-259.000.

Logan, Ralph Andre; Merz, James Logan; Reinhart, Franz Karl; and White, Harry Gregory, to Bell Telephone Laboratories, Incorporated. LPE Technique for fabricating tapered optical couplers. 4,028,146, Cl. 148-171.000.

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Lohner, Jacques. Refuse incinerator. 4,027,603, Cl. 110-18.00R.

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Lonza Ltd.: *See—*
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Lopata, Ira. Leader-pin. 4,027,832, Cl. 242-197.000.

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Lummus Company, The: *See—*
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Lund, Norman S.; Young, George Ralph, Jr.; and Lund, Norman W. Liquid purification system. 4,028,246, Cl. 210-151.000.

Lund, Norman W.: *See—*
Lund, Norman S.; Young, George Ralph, Jr.; and Lund, Norman W., 4,028,246.

Lundell, Vernon J. Round hay baler apparatus. 4,027,465, Cl. 56-341.000.

Lundgren, Bengt G. S., to SKF Nova AB. Process for manufacturing a reinforcing material for concrete. 4,027,718, Cl. 164-46.000.
Lundin, Lars Olof, to AB Bofors. Device for co-ordinated driving of a towing vehicle and a towed vehicle. 4,027,738, Cl. 180-14.00A.
Lundstrom, Bengt, to Jungers Verkstads AB of Goteborg. Curing oven for mineral wool. 4,028,051, Cl. 432-144.000.
Luoma, Eino J.: *See—*
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Lupke, Gerd: *See—*
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Lupke, Manfred: *See—*
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Lyon, Warren Charles; and Hayes, William H., Jr., to Hittman Corporation. Pressure sensor. 4,027,661, Cl. 128-2.00A.
M-B-W, Inc.: *See—*
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Maass, Helmut A., to M-B-W, Inc. Concrete finisher with retractable guard ring section. 4,027,991, Cl. 404-112.000.
MacDonald, John M.; and Kartzmark, Robert, to Exxon Research and Engineering Company. Process for the preparation of low pour point lubricating oils. 4,028,224, Cl. 208-92.000.
MacFadyen, Donald Edward, to Glyco Chemicals, Inc. Fatty and benzoic acid esters of ethoxylated hydantoins substituted or not in the 5-position. 4,028,378, Cl. 260-309.500.
MacInnes, Hugh, to Roto-Master, Inc. Partially divided turbine housing for turbochargers and the like. 4,027,994, Cl. 415-1.000.
Mackay Center Specialties, Inc.: *See—*
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Macken, Elmer N.: *See—*
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Mackey, Bruce A., Jr.: *See—*
Mackey, Bruce A., Sr.; and Mackey, Bruce A., Jr., 4,027,992.
Mackey, Bruce A., Sr.; and Mackey, Bruce A., Jr. Boring tool guide device. 4,027,992, Cl. 408-97.000.
MacLeay, Ronald Edward: *See—*
Lange, Harold Carl; and MacLeay, Ronald Edward, 4,028,344.
MacMillan, Kenneth T. Retreading mold with bladder for creating annular vacuum gap. 4,028,029, Cl. 425-23.000.
Madland, Robert Christen; Zielinski, Robert Michael, Jr.; and Engstrom, Keith Allen, to Illinois Tool Works Inc. Double depression magnetic keyswitch. 4,028,696, Cl. 340-365.00L.
Maekawa, Masao: *See—*
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Magdo, Ingrid E.: *See—*
Joy, Richard C.; Magdo, Ingrid E.; and Phillips, Alfred, Jr., 4,028,717.
Magee, Thomas A., to Diamond Shamrock Corporation. Ketoxime carbamates. 4,028,413, Cl. 260-566.0AC.
Magni, Antonio, to Axis S.p.A. Device for angularly centering a member having an annular toothed formation. 4,027,375, Cl. 29-282.000.
Maillot, Jean, to Guterman, Paulette. Electromagnetic vibration-detector device, in particular for anti-theft purposes. 4,028,567, Cl. 310-25.000.
Mailloux, Louis D., to Xerox Corporation. Color transparency reproducing machine. 4,027,962, Cl. 355-4.000.
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Makolska, Hanna: *See—*
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Malloy, John F., to Norton Company. Coated abrasive article containing a polyurethane adhesive splice. 4,027,435, Cl. 51-295.000.
Mamvriisky, Alexandr Sergeevich; and Lapchenko, Alexandr Mikhailovich. Method of controlling the density of a plugging fluid. 4,027,860, Cl. 259-149.000.
Manchak, Frank, Jr. Method and apparatus for treating sumps. 4,028,240, Cl. 210-59.000.
Mannesmann Aktiengesellschaft: *See—*
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Mannesmannrohren-Werke AG: *See—*
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Mansell, John Douglas, to PPG Industries, Inc. Removal of monochloroacetylene from chlorinated hydrocarbons. 4,028,426, Cl. 260-652.00P.
Manzini, Ferruccio, to Abred Establishment. Variable ratio hydraulic master-cylinder. 4,027,482, Cl. 60-574.000.
Marcatili, Enrique Alfredo Jose, to Bell Telephone Laboratories, Incorporated. Method for manufacturing helical optical fiber. 4,028,081, Cl. 65-2.000.
Marchese, Anthony: *See—*
Luce, David A.; and Marchese, Anthony, 4,027,569.
Marino, Frank, to Wooster Brush Company, The. Brush construction. 4,027,351, Cl. 15-192.000.
Marsh, David Raymond; and Osofsky, Raymond C., to Singer Company, The. Real-time simulation of point system having multidirectional points as viewed by a moving observer. 4,027,403, Cl. 35-10.200.
Marshall, Manly Ernest. Instrument for taking samples. 4,027,658, Cl. 128-2.00W.
Martin, Francois. Weatherproof decal. 4,028,474, Cl. 428-40.000.
Martin, James F. Multi-chamber muffler. 4,027,740, Cl. 181-68.000.
Martin Marietta Corporation: *See—*
Chihoski, Russell Alexander; and De Fellippie, John Charles, 4,028,522.
McClure, George F.; Endicott, John Richard; Freeman, Lionel D.; Cunningham, Marion L.; and Wells, Joel D., 4,028,500.
Martin, Robert C., to Dow Chemical Company, The. Cement composition. 4,028,125, Cl. 106-89.000.
Martin, Sam M., to Consumers Glass Company Limited. Stackable and nestable container. 4,027,796, Cl. 206-507.000.
Maruzen Oil Co. Ltd.: *See—*
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Marvin Glass & Associates: *See—*
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Barlow, Gordon A.; and Katzman, Allison W., 4,027,423.
Breslow, Jeffrey D.; and Frumkin, Mitchell J., 4,027,877.
Marx, Alvin J. Semirigid counterforce brace. 4,027,666, Cl. 128-165.000.
Masaki, Kenji; and Tokura, Naomi, to Nissan Motor Co., Ltd. Multiple-cylinder internal combustion engine. 4,027,478, Cl. 60-285.000.
Maschinen- und Bohrgerate-Fabrik Alfred Wirth & Co., K.G.: *See—*
Wallrafen, Gunter, 4,027,559.
Mashimo, Satoshi: *See—*
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Maske, Fred John; and Nordgren, Robert, to General Mills Chemicals, Inc. Plaster of paris using glyoxal treated hydroxyalkyl guar. 4,028,127, Cl. 106-111.000.
Maskell, Richard N., to Container Corporation of America. Vacuum chamber structure and control system therefor. 4,027,707, Cl. 141-66.000.
Mason, Paul B.: *See—*
Stella, Joseph A.; and Mason, Paul B., 4,027,956.
Massa, Frank, to Fred M. Dellorfano, Jr., and Donald P. Massa, Trustees of The Stoneleigh Trust u/d/t. Acoustic amplifier combined with transducer shock mount. 4,028,504, Cl. 179-146.00R.
Massachusetts Institute of Technology: *See—*
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Massey-Ferguson Inc.: *See—*
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Massey, James Vincent, III: *See—*
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Mathieson, Niall, to Mackay Center Specialties, Inc. Perforating machine. 4,027,828, Cl. 242-56.600.
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Matsumoto, Hatsuo: *See—*
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Matsuo, Tadao; Miura, Minoru; Mashimo, Satoshi; Kakei, Masanori; and Mishima, Kyoichi, to Mitsubishi Belting Limited. Vulcanized acrylate-ethylidene norbornene polymers. 4,028,316, Cl. 260-79.50P.
Matsuoka, Hideoki; and Tsuda, Hiroshi. Knee protector. 4,027,906, Cl. 280-751.000.
Matsuoka, Michio: *See—*
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Matsushita Electric Industrial Co., Ltd.: *See—*
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Matsuura, Mikio; Nishi, Nobuji; Matsuoka, Michio; and Masuyama, Takeshi, to Matsushita Electric Industrial Co., Ltd. Voltage-dependent resistor. 4,028,277, Cl. 252-519.000.

Mattei, Frank V., to Ethicon, Inc. Coated sutures. 4,027,676, Cl. 128-335.500.

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Matthes, Hans; and Mauler, Erhard, to AEG-Elotherm G.m.b.H. Bridge circuit arrangement on electrical frequency converters which can be fed with a D.C. current. 4,028,608, Cl. 321-8.00R.

Mattson, Gary. Tube dispenser. 4,027,784, Cl. 222-102.000.

Mauler, Erhard: *See—*
Matthes, Hans; and Mauler, Erhard, 4,028,608.

Maurino, William J.; and Putzer, Raymond M., to Precision Flexmold, Inc. Molding apparatus including a flexible mold for making articles having radially inwardly extending projections on an interior surface. 4,027,723, Cl. 164-213.000.

May, Carl Jerome, Jr.: *See—*
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Mazur, Robert H.: *See—*
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Mazzarella, Emil D., to National Starch and Chemical Corporation. Process of making paper. 4,028,172, Cl. 162-164.00R.

Mazzeo, Charles F., to Amerace Corporation. Electrical connector with captive clamping jaw. 4,027,940, Cl. 339-272.00R.

McAleer, William J.; and Hurni, William M., to Merck & Co., Inc. Apparatus for preparing isolated cells from tissue. 4,028,190, Cl. 195-127.000.

McClure, George F.; Endicott, John Richard; Freeman, Lionel D.; Cunningham, Marion L.; and Wells, Joel D., to Martin Marietta Corporation. Mobile unit supervisory control sequencer and method. 4,028,500, Cl. 179-41.00A.

McDonnell Douglas Corporation: *See—*
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McDougall, Ian Leitch, to Imperial Metal Industries (Kynoch) Limited. Superconductors. 4,028,488, Cl. 174-128.00S.

McElroy, Bennitt, to Fairchild Industries Inc. Seat armrest and process of manufacture thereof. 4,027,916, Cl. 297-194.000.

McGivern, Robert F., to Sybron Corporation. Sewage settling tank. 4,028,249, Cl. 210-242.00R.

McGourty, Thomas K. Push-button combination lock. 4,027,508, Cl. 70-214.000.

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McGowan, Malissa A. Protective and/or decorative cover for walking aids. 4,027,687, Cl. 135-66.000.

McKee, William H.; and Schubert, Anthony E., to TRW Inc. Apparatus for making terminal connectors. 4,027,521, Cl. 72-404.000.

McKibben, Gerald H.; and Davich, Theodore B., to United States of America, Agriculture. Air dropped bait dispensers for attracting and killing the cotton boll weevil. 4,027,420, Cl. 43-124.000.

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McLean, William B.; and McLean, Edward P. Cable terminator and grounding unit. 4,028,487, Cl. 174-78.000.

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McPherson, Thomas Buchanan, IV: *See—*
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McReynolds, Glen Harold, Jr., to Esquire, Inc. Faceted parabolic-type reflector system. 4,028,542, Cl. 240-41.360.

Mead, George N. J.; and Corneliusen, Philip R. Pneumatic cleaning mat and method of making same. 4,027,355, Cl. 15-310.000.

Meckler, Gershon. Solar energy collector. 4,027,653, Cl. 126-271.000.

Mehaffey, Joseph H.; Mills, Edgar C.; and Ivester, J. Harold, to Solid State Systems, Inc. Private automatic branch exchange system and apparatus. 4,028,498, Cl. 179-18.0GE.

Mehesfalvi nee Vajna, Zsuzsanna: *See—*
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Mengele, Alois, deceased: *See—*
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Mengele, Dieter Kark Paul, legal representative: *See—*
Grimm, Klaus; and Mengele, Alois, deceased, 4,027,826.

Mengle, Lewis Irwin, to RCA Corporation. Parabolic current generator. 4,028,586, Cl. 315-368.000.

Menssen, Ernst, to Linde Aktiengesellschaft. Screw compressor with involute profiled teeth. 4,028,026, Cl. 418-201.000.

Merck & Co., Inc.: *See—*
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Merck Patent Gesellschaft mit beschrankter Haftung: *See—*
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Merrill, Charles T. Adjustable curber and sidewalk-forming machine. 4,027,990, Cl. 404-98.000.

Merrill, Duane F., to General Electric Company. Organopolysiloxane release resins useful in cooking and baking processes. 4,028,339, Cl. 260-46.50R.

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Meyer, Willy; Bohner, Beat; Dawes, Dag; and Rufenacht, Kurt, to Ciba-Geigy Corporation. O,S-dialkyl- and O-alkyl-S-alkoxyalkyl-S-1,2,4-oxa-diazolyl-3-methylene dithiophosphates. 4,028,377, Cl. 260-307.00G.

Michalko, Edward, to Universal Oil Products Company. Method for producing an alumina sol. 4,028,216, Cl. 252-313.00R.

Midcon Pipeline Equipment Co.: *See—*
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Millar, John M.; and Moran, William F., to Beatrice Foods Co. Multilayer coated substrate. 4,027,366, Cl. 428-623.000.

Millard, Ben; and Robie, Susan P., to Scott Paper Company. Metal plate treating solution. 4,028,281, Cl. 252-527.000.

Miller, Adason Morey. Method and apparatus for discharge of hot asphalt tanker. 4,027,782, Cl. 222-1.000.

Miller, Eldon D.; and Washburn, Ryan F., to Lava Crucible Refractories Company. Process for making refractory shapes. 4,028,453, Cl. 264-67.000.

Miller, Frederick A., to Circon Corporation. Vidicon camera for closed circuit television system. 4,028,730, Cl. 358-217.000.

Miller, Jimmy L.; and Schnell, William J., to Baxter Laboratories, Inc. Dialyzer connector system. 4,028,253, Cl. 210-321.00B.

Miller, Walter E., Jr.; and Duke, Jimmy R., to United States of America, Army. Optical tracking link utilizing pulse burst modulation for solid state missile beacons. 4,027,837, Cl. 244-3.160.

Miller, Wayne L.; and Carnicelli, Ernest J., to Cessna Aircraft Company, The. DME apparatus and method. 4,028,698, Cl. 343-6.5LC.

Milliken Research Corporation: *See—*
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Minolta Camera Kabushiki Kaisha: *See*—
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Mio, Mitushi. Method for forming a casting mold and a flexible pattern to be used therefor. 4,027,717, Cl. 164-44.000.
Mira-Pak, Inc.: *See*—
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Mirrex, Incorporated: *See*—
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Mischke, Peter: *See*—
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Mishcon, Lester; and Christopolous, John, to Singer Company, The. Circular knitting machine with disengaging positive yarn feeding means. 4,027,505, Cl. 66-125.00R.
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Misu, Hiroshi: *See*—
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Mitsui Mining & Smelting Co., Ltd.: *See*—
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Miyazaki, Toru, to Alps Motorola, Inc. Head indexing apparatus for a combined two and four channel tape player/recorder. 4,028,735, Cl. 360-106.000.
Miyazawa, Kuichiro: *See*—
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Mizutani, Yoshiyuki; Tada, Masaaki; and Imada, Yasuo, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Self-lubricating iron base alloy. 4,028,097, Cl. 75-123.0AA.
Moat, Nicholas Warrington, to Edwin Cooper & Company Limited. Corrosion inhibitors. 4,028,117, Cl. 106-14.000.
Moberg, Lars-Goran: *See*—
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Brown, George L.; and Tobias, Michael A., 4,028,294.
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Herd, Richard S.; and Otto, Ferdinand P., 4,028,259.
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Mochizuki, Kiyoshi: *See*—
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Moder, Helmut, to Robert Bosch G.m.b.H. Control apparatus for starting internal combustion engines. 4,027,641, Cl. 123-179.00L.
Moede, Earl J., to McNeill Favia Co. Clip for retaining a canvas stretcher frame in a decorative picture frame. 4,027,413, Cl. 40-156.000.
Moffett, Robert Bruce, to Upjohn Company, The. Triazinobenzodiazepines. 4,028,356, Cl. 260-248.0AS.
Moll, Dean H.; and Greiner, Alan, to Singer Company, The. Balancing system for a rotating mass. 4,028,524, Cl. 219-121.00L.
Mominee, David E.; and Vance, Gilbert W., to Reed Irrigation Systems. Apparatus for creating holes in flexible members. 4,028,525, Cl. 219-121.00L.
Monahan, Earnest M.; and Patterson, Garvin W., to Honeywell Information Systems, Inc. Apparatus for dispatching data of the highest priority process having the highest priority channel to a processor. 4,028,664, Cl. 340-172.500.
Monsanto Company: *See*—
Higginbottom, Harold P., 4,028,367.
King, Henry L., 4,028,330.
Tyssee, Donald Armon, 4,028,201.
Monsky, Jeffrey N.; and Combs, Glen, to McMiah Corporation, The. Inflatable building. 4,027,437, Cl. 52-2.000.
Montagut, Jose Salvador. Process and apparatus for the continuous obtainment by displacement of cylindrical or prismatic hollow bodies produced with fibre-reinforced synthetic resins. 4,028,164, Cl. 156-173.000.
Mooradian, Aram: *See*—
Alexander, Ernest John; and Mooradian, Aram, 4,028,382.
Moore, Earl Phillip, Jr., to Du Pont de Nemours, E. I., and Company. Process for the preparation of azodinitriles from aminonitriles in the presence of a surfactant. 4,028,345, Cl. 260-192.000.
Moore, Ernest George: *See*—
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Moore, Harlan D.: *See*—
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Moore, Robert F.: *See*—
Schulman, Joseph H.; and Moore, Robert F., 4,027,677.
Moorman, James H., Jr., to Blue Bird Body Company (Entire). Wheelchair holding device for vehicles. 4,027,747, Cl. 188-28.000.
Moran, John Christian, to Bell Telephone Laboratories, Incorporated. Memory patching circuit. 4,028,678, Cl. 340-172.500.
Moran, John Christian: *See*—
Divine, Charles Hamman; and Moran, John Christian, 4,028,684.
Moran, William F.: *See*—
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Morantz, Herbert; and Morantz, Stanley. Drapery length marking device. 4,027,394, Cl. 33-18.00R.
Morantz, Stanley: *See*—
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Moravcsik, Imre: *See*—
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Moreau, Marc, to Trefimetaux. Device for continuous extrusion. 4,027,514, Cl. 72-60.000.
Moreland, Stephen T. Manufacture of filled capsules or the like. 4,028,024, Cl. 425-133.100.
Mori, Ikuo; and Shimizu, Yoshiyuki, to Nippon Kogaku K.K. Parfocal low-magnification microscope objective lens systems. 4,027,951, Cl. 350-175.0ML.
Mori, Shigejiro; Uchikawa, Hiroshi; and Uchida, Shunichiro, to Onoda Cement Company, Ltd. Process for manufacturing rapid hardening portland cement clinker. 4,028,126, Cl. 106-100.000.
Moricca, Larry S.; and Zaker, Gregory A., to Inventive Industries, Inc. Apparatus for adapting multi-line telephone instrument for use by the blind. 4,028,502, Cl. 179-99.000.
Morimoto, Teijiro: *See*—
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Morimoto, Yoshio: *See*—
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Morimoto, Yutaka: *See*—
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Morita, Masayuki: *See*—
Shimogawa, Toshiaki; Morita, Masayuki; and Kawaharazaki, Takashi, 4,027,905.
Moriya, Hisanori; and Osawa, Tadao, to Hitachi, Ltd. Exhaust gas recirculation device. 4,027,638, Cl. 123-119.00A.
Moriya, Kunitoshi: *See*—
Suzuki, Masao; and Moriya, Kunitoshi, 4,028,666.
Moriyama, Akio; Fukai, Masakazu; Tatsuta, Hiroshi; Takahashi, Hiroaki; and Esaki, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Electro-optical display device. 4,027,950, Cl. 350-160.0LC.
Morris, Florin V., to Caywood, Howard E., a part interest. Collapsible dressing hook for animals. 4,027,357, Cl. 17-44.000.
Morris, Livingston B., to Extracorporeal Medical Specialties Inc. Accordion fold flat plate dialyzer. 4,028,252, Cl. 210-321.00B.
Morrison, Howard J.; and Keller, Albert G. Sound actuated figure toys. 4,027,425, Cl. 46-264.000.
Mortimer, Thomas J., to Sanders Associates, Inc. Pager subsystems. 4,028,661, Cl. 340-324.00M.
Morton, Avery A.; and Lanpher, Edward J. Alfin polymerized rubber. 4,028,484, Cl. 526-335.000.
Morton-Norwich Products, Inc.: *See*—
Fessler, Dyral C.; Heavner, George A.; and Massey, Thomas H., 4,028,401.
Peiosi, Stanford Salvatore, Jr.; and Alaimo, Robert James, 4,028,374.
Schwan, Thomas J., 4,028,359.
Mory, Rudolf, to Ciba-Geigy Corporation. 6-Methylbenzimidazoionylazobarbituric acid pigment. 4,028,322, Cl. 260-154.000.
Mos, Robert J., to American Magnetics Corporation. Plural magnetic head assembly with independently supporting structure. 4,028,734, Cl. 360-104.000.

Moser, Willard W. Tie down brackets for securing bights of flexible members. 4,027,360, Cl. 24-146.000.

Moslener, Jorn: *See—*
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Motley, David M.; and Cheng, King Y., to Hycom Incorporated. Digital data receiver with automatic timing recovery and control. 4,028,626, Cl. 325-324.000.

Motorola, Inc.: *See—*
Bainter, James R., 4,028,560.
Cho, Susumu; Erickson, Paul Milton; and Null, Michael William, 4,028,627.
Helda, Robert W., 4,028,722.
Leach, George S., Jr., 4,028,671.

Motoyama, Shimesu, to Freund Industrial Co., Ltd. Fluid granulating-/coating apparatus utilizing suction air current. 4,027,624, Cl. 118-303.000.

Mott, James R. Combustion system. 4,027,602, Cl. 110-7.00R.

Mounton, William J., Jr. Self-equalizing linkage for well derricks. 4,027,854, Cl. 254-29.00R.

Mueller, Floyd F., to American Hospital Supply Corporation. Combination safety stop and down lock for folding tables. 4,027,600, Cl. 108-113.000.

Mueller, Siegfried. Permanent-wave or water-wave curler. 4,027,684, Cl. 132-40.000.

Mugnier, Robert: *See—*
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Mukaida, Yutaka: *See—*
Enomoto, Satoru; Takita, Hitoshi; Wada, Hisayuki; Mukaida, Yutaka; and Yanaka, Mikiro, 4,028,387.

Mull, Richard T., to Great Lakes Carbon Corporation. Method and apparatus for determining the relative roughness of holes in refractory compositions. 4,027,525, Cl. 73-37.000.

Muller, Fritz. Valve for aggressive fluids. 4,027,849, Cl. 251-30.000.

Muller, Hans-Jurgen: *See—*
Schafer, Walter; Wagner, Kuno; and Muller, Hans-Jurgen, 4,028,310.

Muller, Marcel: *See—*
Alig, Leo; Furst, Andor; Keller, Peter; Muller, Marcel; Kerb, Ulrich; and Wiechert, Rudolf, 4,028,400.

Muller, Peter; Wagner, Kuno; and Muller, Richard, to Bayer Aktiengesellschaft. Process for the production of water-dispersible polyhydroxyl compounds. 4,028,313, Cl. 260-77.5AP.

Muller, Richard: *See—*
Muller, Peter; Wagner, Kuno; and Muller, Richard, 4,028,313.

Muller, Werner Heinrich; and Weil, Tomas, to Hoechst Aktiengesellschaft. Process for the manufacture of cyclohexandione-1,3. 4,028,417, Cl. 260-586.00C.

Mundil, Waldemar Dietmar, to Deutsche Vergaser GmbH & Co Kommanditgesellschaft. Thermally controlled fluid flow regulating or shut-off valves. 4,027,848, Cl. 251-11.000.

Murai, Masaaki: *See—*
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Murakami, Hiroyashu: *See—*
Kawamura, Masaharu; Sakurada, Nobuaki; Shinoda, Nobuhiko; Ito, Tadashi; Ito, Fumio; and Murakami, Hiroyashu, 4,028,712.

Murakami, Noboru; Hirosawa, Koichiro; Ohara, Kazuo; and Matsuo, Koichi, to Aisin Seiki Kabushiki Kaisha. Speed change gear system. 4,027,551, Cl. 74-759.000.

Murakami, Noboru; Hirosawa, Koichiro; Ohara, Kazuo; and Matsuo, Koichi, to Aisin Seiki Kabushiki Kaisha. Speed change gear system. 4,027,552, Cl. 74-765.000.

Murata Manufacturing Co., Ltd.: *See—*
Nakamura, Takeshi, 4,028,640.
Wakino, Kikuo; Nishikawa, Toshio; Tamura, Sadahiro; and Ishikawa, Youhei, 4,028,652.

Murata, Moriyasu; Sai, Fumio; and Fujino, Takashi, to Kao Soap Co., Ltd. Non-phosphate or reduced phosphate detergent compositions containing mixtures of alkyl ether sulfates. 4,028,280, Cl. 252-526.000.

Murata, Moriyasu; Sai, Fumio; and Fujino, Takashi, to Kao Soap Co., Ltd. Granular or powdery detergent composition. 4,028,283, Cl. 252-551.000.

Murauskas, Donald J.; Kish, Edward E., Jr.; Cunningham, Frank M.; Gallagher, Bernard J.; and Shufflebarger, Earl D., to Nupro Company. Fluid filter. 4,028,248, Cl. 210-232.000.

Murray, James Gordon: *See—*
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Muzzy, John D.: *See—*
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Mygatt, Leonard T., Jr.; and Goldsmith, Edward E., to National Packaging Associates Corporation. Tamper-indicating container and lid therefor. 4,027,775, Cl. 220-266.000.

Myren, Harry Ingemar, to Aktiebolaget Karlstads Mekaniska Werkstad. Apparatus for collecting liquids thrown from a moving member. 4,028,174, Cl. 162-264.000.

N-S-W Corporation: *See—*
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Nagano, Masashi, to Shimano Industrial Company, Limited. Derailleur for bicycle. 4,027,542, Cl. 74-217.00B.

Nagao, Kameji: *See—*
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Nagata, Takashi: *See—*
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Nagayoshi, Konno, to Koritsu Kikaikogyo Co., Ltd. Coke oven door. 4,028,193, Cl. 202-248.000.

Nagoshi, Kazuo: *See—*
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Nail, Nelson R.: *See—*
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Nakajima, Shigeo: *See—*
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Nakajima, Yasuo: *See—*
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Nakamura, Akira: *See—*
Arai, Hiroshi; Nakamura, Akira; Sugiura, Akio; Okamoto, Atutoshi; and Toyama, Koichi, 4,027,926.

Nakamura, Hiroyuki; Kawaguchi, Hiroshi; and Nishiwaki, Kiyoshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Safety device for an oil hydraulic braking system. 4,028,658, Cl. 303-6.00C.

Nakamura, Takeshi, to Murata Manufacturing Co., Ltd. Piezo-electric tuning fork oscillation circuit. 4,028,640, Cl. 331-116.00R.

Nakamura, Yasuharu: *See—*
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Nakane, Masami: *See—*
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Nakao, Kiyoharu: *See—*
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Nakashima, Sunao: *See—*
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Nakasuji, Norikazu; Kataoka, Takashi; Inagaki, Hiroshi; and Nakashima, Sunao, to Pilot Ink Co., Ltd. Thermochromic materials. 4,028,118, Cl. 106-21.000.

Nakauchi, Shunsaku, to Kokusai Gijutsu Kaihatsu Kabushiki Kaisha. Dot printer. 4,027,762, Cl. 197-1.00R.

Namura, Kiyoshi: *See—*
Kuroda, Michio; Namura, Kiyoshi; Kato, Fumio; Yamazaki, Yoshiaki; Iwasaki, Tutomu; Ishida, Akira; Sohma, Akio; and Imai, Tetsu, 4,028,006.

Nardozzi, Michael A., Jr. Rapid transit system. 4,027,596, Cl. 104-138.00R.

Narozny, Ronald S., to Thomas & Betts Corporation. Termination method and apparatus for flat flexible cable. 4,027,941, Cl. 339-14.00R.

National Development Research Corporation: *See—*
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National Distillers and Chemical Corporation: *See—*
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National Gypsum Company: *See—*
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National Packaging Associates Corporation: *See—*
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National Research Development Corporation: *See—*
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Naudy, Rene; Phoyu, Francois; Robert, Louis; Legousse, Maurice; Audouard, Jean-Marie; and Le Roux, Herve, to Ciments Lafarge S.A. Method and installation of treating raw material for producing cement. 4,028,049, Cl. 432-14.000.

NCR Corporation: *See—*
Crump, Leslie L.; and Italiano, Victor J., 4,027,765.
Quaif, Richard S., 4,027,761.

Nedstedt, Gert: *See—*
Rausing, Ruben; Nedstedt, Gert; Holmstrom, Hakan; Palm, Lars-Erik; and Stefan, Stjepan, 4,027,455.

Needham, Donald G.; Taylor, Kenneth P.; and Brown, Claude V., to Phillips Petroleum Company. Stabilization of cross-linked polyolefins. 4,028,332, Cl. 260-45.80R.

Nelson, David M., to Ambac Industries, Inc. Gas analyzer. 4,028,057, Cl. 23-254.00E.

Nelson, James P., to Standard Oil Company (Indiana). Poly(cyclohexanedimethylene dibromoterephthalate). 4,028,308, Cl. 260-75.00H.

Nelson, Norman A., to Upjoin Company, The. 2-Decarboxy-2-hydroxymethyl-cis-4,5-didehydro-PGE, compounds. 4,028,419, Cl. 260-586.00R.

Nemoto, Hideo; and Koike, Yuuji, to Kabushiki Kaisha Daini Seikosha. Connector having electro-conductive rubber terminal. 4,027,936, Cl. 339-59.00M.

Neri, Joseph Dominic; and Williams, John Lewis, to Burroughs Corporation. Ink transfer member. 4,028,286, Cl. 260-2.50P.

Nestler, Heinz: *See—*
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Neuzil, Richard W.; and Rosback, Donald H., to Universal Oil Products Company. Process for the separation of ethylbenzene. 4,028,428, Cl. 260-674.0SA.

Newell, Dennis E., to Robertshaw Controls Company. Motor control circuit. 4,028,593, Cl. 361-27.000.
Neyret, Guy, to Genoud & Cie. Cigarette lighter with presale tamper protection. 4,028,043, Cl. 431-144.000.
Ngo, Peter Dinh-Tuan, to Bell Telephone Laboratories, Incorporated. Liquid crystal display device. 4,028,692, Cl. 340-324.00M.
Niagara Machine & Tool Works: *See—*
Jones, Clarence O., Jr., 4,027,567.
Nickerson, David L., to Korfil, Incorporated. Insulated block. 4,027,445, Cl. 52-405.000.
Nickols, Richard C., Jr.: *See—*
Tuschner, Jerome G.; and Nickols, Richard C., Jr., 4,028,324.
Nicou, Parasko: *See—*
Dumoulin, Jean; and Nicou, Parasko, 4,028,298.
Niemeyer, Willy; and Simon, Helmut, to Windmoller & Holscher. Apparatus for applying contact pressure to packs of tube sections. 4,027,871, Cl. 271-95.000.
Nieskens, Antonius; Slenders, Petrus; and Palmkoeck, Christian, to Robert Bosch G.m.b.H. Sealing machine. 4,027,459, Cl. 53-59.00R.
Niikura, Masakatsu, to Janome Sewing Machine Co. Ltd. Intermittent stitching device for sewing machines. 4,027,610, Cl. 112-275.000.
Niiro, Yasuhiko, to Kokusai Denshin Denwa Kabushiki Kaisha. System equalization for repeatered submarine cable system. 4,028,644, Cl. 333-16.000.
Nikitin, Dmitry Valentinovich, administrator: *See—*
Cherednichenko, Vladimir Semenovich; Orlov, Gennady Ivanovich; Mikulinsky, Aron Semenovich; Arzamastsev, Jury Semenovich; Efremkin, Vladimir Vasilievich; Nikitin, Valentin Alexeevich, deceased; Nikitina, Valentina Kuzminichna, administrator; and Nikitin, Dmitry Valentinovich, administrator, 4,027,861.
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Nikitina, Valentina Kuzminichna, administrator: *See—*
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Nippon Electric Company, Ltd.: *See—*
Araseki, Takashi; and Ochiai, Kazuo, 4,028,506.
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Nippon Hoso Kyokai: *See—*
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Nippon Kogaku K.K.: *See—*
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Nippon Kokan Kabushiki Kaisha: *See—*
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Nippon Soken, Inc.: *See—*
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Nishimura, Shigeoki; Sawa, Toshio; Otani, Kouji; and Kikkawa, Seiichi, to Hitachi, Ltd. Method and apparatus for treatment of fluorine-containing waste waters. 4,028,237, Cl. 210-45.000.
Nishioka, Matsuo, to Matsushita Electric Industrial Co., Ltd. Electronic component having a fine adjustment mechanism. 4,027,541, Cl. 74-10.540.
Nishiwaki, Kiyoshi: *See—*
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Noguchi, Yasuhiro: *See—*
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Nolley, John P., Jr.; and Kunesh, John G., to UOP Inc. Purification and drying of hydrocarbon streams with adsorbents. 4,028,069, Cl. 55-33.000.
Nomura, Chifuru, to Kitazawa Shoji Kabushiki Kaisha. Pump or motor having sealed chambers. 4,027,576, Cl. 91-339.000.
Nomura, Toshio: *See—*
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Norden, Alexander R. Electrical terminal blocks. 4,027,937, Cl. 339-66.00M.
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North, Bernard F.; and Lourigan, George H., to Sun Chemical Corporation. Permanent-press system. 4,028,054, Cl. 8-185.000.
North, William D.: *See—*
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Northern Electric Company Limited: *See—*
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Ochsner, Rolf H., to Robertshaw Controls Company. Method of making a plurality of substantially identical flexible diaphragms. 4,028,461, Cl. 264-297.000.
O'Connell, Gerard Peter. Art of brewing individual servings of coffee in a cup. 4,027,582, Cl. 99-306.000.

Oda, Yasuhiro: *See—*
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Ogawa, Taizo: *See—*
Tsuchiya, Hiroshi; Mukai, Kunio; Kimura, Akio; Taya, Hiroshi; Fujimoto, Keimei; Ozaki, Toshiaki; Yamamoto, Sigeo; Ogawa, Taizo; Ooishi, Tadashi; and Okuno, Yositosi, 4,028,438.

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Ohio State University, The: *See—*
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Olin, John Merrill; and Urs, Venkataramaraj Subbaraj, to Olin Corporation. Disintegrating lead shot. 4,027,594, Cl. 102-92.400.

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Olson, Gregory J., to Packaging Corporation of America. Shipping container. 4,027,794, Cl. 206-395.000.

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Olstowski, Franciszek, to Dow Chemical Company, The. Solid, rapid-setting, rigid polyurethanes. 4,028,296, Cl. 260-30.40N.

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Pankove, Jacques Isaac, to RCA Corporation. Photovoltaic device. 4,028,720, Cl. 357-30.000.
Panneman, Harm Jan; and Bruins, Antonius Hermanus Nicolaas Maria, to Akzona Incorporated. Hydrazinc-imidazole derivatives. 4,028,380, Cl. 260-309.600.
Parham, Harold D. Vacuum type coal separator. 4,028,231, Cl. 209-457.000.
Parker, Billy J.: *See*—
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Parker, Richard W.; and Kaeser, Arthur L., to Parker Sweeper Company. Spreader for fertilizer, seed and the like. 4,027,788, Cl. 222-614.000.
Parker Sweeper Company: *See*—
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Parks, James R. Cargo restraining assembly for use in a vehicle. 4,027,892, Cl. 280-179.00R.
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Partridge, John Joseph, Jr.; and Uskokovic, Milan Radoje, to Hoffmann-La Roche Inc. Syntheses of 24R,25- and 24S,25-dihydroxycholesterol 24,25-ketals and alkanoyl derivatives thereof. 4,028,349, Cl. 260-239.55D.
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Patznick, Richard Arthur; and Border, Gary Clayton, to Johns-Manville Corporation. Method and apparatus for controlling temperature within a furnace. 4,028,083, Cl. 65-29.000.
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Perkins, Charles H., to Robertshaw Controls Company. Reversing valve construction. 4,027,700, Cl. 137-625.660.
Perkins, Lee E., to Kajan Specialty Company, Inc. Tool for washing perforations in cased well bore. 4,027,732, Cl. 166-312.000.
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Peterson, Robert S., to Westinghouse Electric Corporation. Multi-loop direct current motor regulating system protected against windup by a clamp circuit. 4,028,601, Cl. 318-271.000.
Petritsch, Klaus; and Korl, Peter, to Osterreichische Chemische Werke Gesellschaft m.b.H, Firma. Method of producing tartaric acid. 4,028,407, Cl. 260-536.000.
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Pielkenrood, Jacob, to Pielkenrood-Vinitex N.V. Separation device. 4,028,256, Cl. 210-519.000.
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Pierce, Donald Cameron. Marking gauge for measuring and marking French mats. 4,027,396, Cl. 33-96.000.
Pierce, Harless. Chain anchor. 4,027,989, Cl. 403-291.000.
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Poncy, Mark P.; Poncy, Richard P.; and Poncy, George W. Digitally insertable tampon. 4,027,673, Cl. 128-285.000.

Poncy, Richard P.: *See—*
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Tschinkel, John; and Ballweg, Raymond A., 4,027,587.

Powers, Frank M.: *See—*
Chia, E. Henry; Powers, Frank M.; and Chadwick, Kenneth E., 4,028,141.

PPG Industries, Inc.: *See—*
Bonaddio, Robert M., 4,027,562.
Mansell, John Douglas, 4,028,426.

Precision Flexmold, Inc.: *See—*
Maurino, William J.; and Putzer, Raymond M., 4,027,723.
Putzer, Raymond M., 4,027,845.

Preradovich, Radovan. Shaft liner assembly. 4,027,488, Cl. 61-41.00R.

Pretto, John. Angle of attack indicating device. 4,027,533, Cl. 73-188.000.

Prevedello, Aldo; and Platone, Edoardo, to Snam Progetti, S.p.A. Method for the preparation of octene-nitrile organic compounds and compounds obtained thereby. 4,028,395, Cl. 260-465.400.

Pries, Thomas H.: *See—*
Taylor, Fredrick J.; Smith, Jack; and Pries, Thomas H., 4,028,673.

Priewasser, Georg: *See—*
Ellbrunner, Adalbert; Priewasser, Georg; Georg, Friedrich; and Stock, Horst, 4,028,137.

Prince Manufacturing, Inc.: *See—*
Sweeton, Gerard F., 4,027,646.

Prinz, Richard; Elghani, Salah Elabd; Fischer, Winfried; and Alberts, Heinrich, to Bayer Aktiengesellschaft. Thermoplastic moulding compounds. 4,028,433, Cl. 260-873.000.

Prull, Phillip Earl. Method for extracting oil from oil shale. 4,028,222, Cl. 208-11.00R.

Pullens, Gedell. Portable battery operated hot-cold storage unit. 4,027,727, Cl. 165-48.000.

Pullman Incorporated: *See—*
Adler, Franklin P.; and Pavolka, John D., 4,027,921.
Deller, Robert J.; and Carmel, Edwin L., 4,027,743.

Puron, Jean Paul: *See—*
Cachier, Gerard; and Puron, Jean Paul, 4,028,556.

Puskas, Imre; and Cengel, John A., to Standard Oil Company (Indiana). Polybutene composition containing halo-carbonyl additives and use thereof. 4,028,264, Cl. 252-182.000.

Putter, Rolf: *See—*
Rottloff, Gunther; Sundermann, Rudolf; Grigat, Ernst; and Putter, Rolf, 4,028,393.

Putzer, Raymond M., to Precision Flexmold, Inc. Flexible mold including rigid encapsulated mandrel. 4,027,845, Cl. 249-142.000.

Putzer, Raymond M.: *See—*
Maurino, William J.; and Putzer, Raymond M., 4,027,723.

Quaif, Richard S., to NCR Corporation. Matrix print head impact energy control. 4,027,761, Cl. 197-1.00R.

Quaker Oats Company, The: *See—*
Hohner, Gary Arlyn; and Hyldon, Roy Godfrey, 4,028,468.

Quehen, Andre, to SECIM. Device for restoration of the mechanical characteristics of the metal band in a casting wheel for continuous casting of liquid metal. 4,027,725, Cl. 164-278.000.

Quentin, Karl-Ernst; Weil, Ludwig; and Berger, Harald, to Hoechst Aktiengesellschaft. Water purification process. 4,028,233, Cl. 210-28.000.

Quinlivan, Richard Paul, to General Electric Company. High angle of attack aircraft control system utilizing a pseudo acceleration signal for control purposes. 4,027,839, Cl. 244-195.000.

R. T. Vanderbilt Company, Inc.: *See—*
Karsten, Kenneth S.; and Karabinos, Joseph V., 4,028,394.

Rackard, Troy D., to National Gypsum Company. Single hung window with removable fixed lite. 4,027,431, Cl. 49-458.000.

Radke, Edmund John; and Bair, Joseph Louis, to Borg-Warner Corporation. Compact vibration damper. 4,027,757, Cl. 192-106.200.

Raffel, Jack I.: *See—*
Herndon, Terry O.; and Raffel, Jack I., 4,027,383.

Rahman, Habibur; and Joslyn, Gerald L., to Massey-Ferguson Inc. Single lever control. 4,027,547, Cl. 74-471.0XY.

Rahrig, Donald D.; and Revells, Robert G., to Libbey-Owens-Ford Company. Apparatus for bending and tempering glass sheets by differential cooling. 4,028,086, Cl. 65-273.000.

Ramella, Arnaldo: *See—*
Ramella, Ferdinando; Ramella, Pier Vincenzo; and Ramella, Arnaldo, 4,027,408.

Ramella, Ferdinando; Ramella, Pier Vincenzo; and Ramella, Arnaldo. Digger teeth with interlocking tooth elements. 4,027,408, Cl. 37-141.00T.

Ramella, Pier Vincenzo: *See—*
Ramella, Ferdinando; Ramella, Pier Vincenzo; and Ramella, Arnaldo, 4,027,408.

Rand, Maurice: *See—*
Goodfellow, Anthony Gerald; and Rand, Maurice, 4,028,042.

Rao, Tadikonda Narashimha; and Toumani, Rouben, to Bell Telephone Laboratories, Incorporated. Transceivers for single channel carrier telephone systems. 4,028,628, Cl. 325-400.000.

Rapistan, Incorporated: *See—*
Staes, Daniel, 4,028,528.

Rattiner, David H.: *See—*
Albanese, Angelo P.; and Rattiner, David H., 4,028,697.

Rauchle, Roy J.; and Vandenberg, John L., to Brunswick Corporation. Engine transmission and speed control with warm-up interlock apparatus. 4,027,555, Cl. 74-878.000.

Rausing, Ruben; Nedstedt, Gert; Holmstrom, Hakan; Palm, Lars-Erik; and Stefan, Stjepan, to Tetra Pak Developpement SA. Packing containers with ripping thread opening and packing material webs for the manufacture of the packing containers. 4,027,455, Cl. 53-14.000.

Ravin, Boris Iosifovich: *See—*
Pitelyaev, Grigory Vasilievich; Telpukhovsky, Evdokim Semenovich; Ravin, Boris Iosifovich; and Gladkov, Alexei Grigorievich, 4,027,441.

Ray, Charles D.: *See—*
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Raymond Corporation, The: *See—*
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Raymond Lee Organization, Inc., The: *See—*
Frame, Bruce H., 4,027,891.
Lawbaugh, J. Medley, 4,027,683.

Raytheon Company: *See—*
Carey, David R.; Goldstone, Bertram J.; and Thompson, Bernard J., 4,028,700.

Razzano, John S., to General Electric Company. Fluorosiloxydiphenylsiloxy block copolymers. 4,028,338, Cl. 260-46.50R.

RCA Corporation: *See—*
Ahmed, Adel Abdel Aziz, 4,028,631.
Anderson, Charles Hammond; and Bloom, Stanley, 4,028,582.
Behrend, William Louis, 4,028,625.
Graham, Ross Chipman, 4,028,724.
Hovagimyan, Norman; Iadicola, Anthony Domenic; and Ianuzzi, William Paul, 4,028,499.
Mengle, Lewis Irwin, 4,028,586.
Pankove, Jacques Isaac, 4,028,720.
van Raalte, John A., 4,028,575.

Recognition Equipment Incorporated: *See—*
Chuang, Ping-Chien, 4,028,674.

Redifon Limited: *See—*
Lobb, Daniel Richard, 4,027,949.

Reed International Limited: *See—*
Thompson, Martin C., 4,027,693.

Reed Irrigation Systems: *See—*
Mominee, David E.; and Vance, Gilbert W., 4,028,525.

Reen, Orville W.; and McMahon, Donald J., to Allegheny Ludlum Industries, Inc. Stainless steel powder. 4,028,094, Cl. 75-.5BA.

Regie Nationale des Usines Renault: *See—*
Rouvre, Philippe; and Augello, Daniel Jean, 4,028,738.

Reichelt, Walter G., to W. C. Heraeus GmbH. Deposited layer type thermometric resistance structure. 4,028,657, Cl. 338-307.000.

Reichen, Willi; and Aste, Robert, to Bolex International SA. Sound-cine-camera. 4,027,955, Cl. 352-72.000.

Reid, Albert R., to Hercules Incorporated. Highly absorbent modified polysaccharides. 4,028,290, Cl. 260-17.4GC.

Reid, F. Joseph: *See—*
Kim, Han J.; and Reid, F. Joseph, 4,028,061.
Kim, Han J.; and Reid, F. Joseph, 4,028,063.

Reid, Robert E.: *See—*
Kablaoui, Mahmoud S.; Reid, Robert E.; and Godfrey, Arthur W., 4,028,258.

Reifel, Charles: *See—*
Leasure, William; Garcia, Luis; Reifel, Charles; and Shelton, Jack, 4,027,579.

Reiher, Wilfred L. Specialized candle. 4,028,045, Cl. 431-289.000.

Reinhart, Franz Karl: *See—*
Logan, Ralph Andre; Merz, James Logan; Reinhart, Franz Karl; and White, Harry Gregory, 4,028,146.

Reiter, Ralph H.: *See—*
Rosen, George; Carlick, Daniel J.; and Reiter, Ralph H., 4,028,204.

Rellico Engineering Limited: *See—*
Collier, Paul Arthur, 4,027,770.

Remington Arms Company, Inc.: *See—*
Dawson, Chester H., 4,027,531.

Rendell, Stanley E.; and Schneider, Richard, to Norlin Music, Inc. Neck-body joint for guitar-like instruments. 4,027,570, Cl. 84-293.000.

Research-Cottrel, Inc.: *See—*
Gleason, Robert Joseph, 4,028,077.

Reuter, Judith A.: *See—*
Jones, David A., Jr.; Schlatter, James M.; Mikulec, Richard A.; Reuter, Judith A.; and Mazur, Robert H., 4,028,319.

Reuter, Martin: *See—*
Lippsmeier, Bernd; Hestermann, Klaus; and Reuter, Martin, 4,028,421.

Reuther, John F., to Westinghouse Electric Corporation. Turbine speed controlling valve operation. 4,028,532, Cl. 235-151.100.

Revells, Robert G.: *See—*
Rahrig, Donald D.; and Revells, Robert G., 4,028,086.

Reynolds, Francis E. Building panel positioner. 4,027,802, Cl. 214-1.0SW.

Rheintechnik Weiland & Kaspar KG: *See—*
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Rhodes, William A. Hydraulic engine. 4,027,480, Cl. 60-531.000.

Rhone-Poulenc Industries: *See—*
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Jouffret, Michel, 4,028,420.

Rhone-Pouleno: *See—*
Labedan, Pierre; Mugnier, Robert; and Chavanel, Hubert, 4,028,209.

Ribback, Erich. Hydraulic press. 4,027,518, Cl. 72-306.000.

Rich, Philip Jay: *See—*
Cherin, Allen Henry; and Rich, Philip Jay, 4,028,162.

Richards, George B., to Fluid Device Corporation. Liquid level control system and carbonator. 4,028,441, Cl. 261-36.00R.

Richter, Friedhelm: *See—*
Pepperhoff, Werner; and Richter, Friedhelm, 4,028,098.

Richter Gedeon Vegyeszeti Gyar RT: *See—*
Bite, Pal; Moravcsik, Imre; Schafer, Inge; Horvath, Gyula; Mehesfalvi nee Vajna, Zsuzsanna; Borvendeg, Janos; and Hermann nee Szente, Ilona, 4,028,348.

Richter, Johan C. F. C., to Kamyr Aktiebolag. Method for continuous treatment of fiber material in a vertical array. 4,028,171, Cl. 162-19.000.

Riessberger, Klaus: *See—*
Theurer, Josef; and Riessberger, Klaus, 4,027,397.

Riessen, Richard R. Low level auger spout. 4,027,768, Cl. 198-370.000.

Rigden, Peter Charles Edwin, to Spicers Limited. Dispenser pack for continuous stationery. 4,027,795, Cl. 206-409.000.

Rihn, William J., to Kinemetrics, Inc. Strong motion accelerograph with self-starter and electrical as well as light outputs. 4,028,659, Cl. 340-17.00R.

Riikonen, Douglas L., to Honeywell Information Systems, Inc. Apparatus for selectively addressing sections and locations in a device controller's memory. 4,028,668, Cl. 340-172.500.

Riken Piston Ring Kogyo Kabushiki Kaisha: *See—*
Takeuchi, Hiroshi; Ishizawa, Toshitugu; Yamano, Tetuyuki; Chiba, Ko; and Kobayashi, Daisaku, 4,028,022.

Rim, Yong S.; and Nudenberg, Walter, to Uniroyal Inc. Dodecahalo-9,10-oxadecahydro-1,4:5,8-dimethanoanthracene flame retardants for polymers. 4,028,437, Cl. 260-880.00R.

Ringland, Robert S., to Tandy Corporation. Band pass amplifier. 4,028,629, Cl. 330-2.000.

Ripoche, Andre: *See—*
Sureau, Claude; Tournaire, Michel; Zorn, Jean-Rene; Sturbois, Gilbert; Chavinie, Jacques; Le Houezec, Roger; and Ripoche, Andre, 4,027,657.

Ritchie, James A., to Caterpillar Tractor Co. Oil seal for a rotary engine. 4,028,020, Cl. 418-51.000.

Ritsko, Joseph E.: *See—*
Laferty, John M., Jr.; Ritsko, Joseph E.; and Port, David J., 4,028,095.

Rittenhouse, Dennis Edwin, to Northern Electric Company Limited. Method and apparatus for translating multiple frequency signalling. 4,028,501, Cl. 179-84.0VF.

Robbins, Roland W., Jr. Solar-energy-powered sun tracker. 4,027,651, Cl. 126-270.000.

Roberge, Emile. Fuel tank cap. 4,028,075, Cl. 55-387.000.

Robert Bosch G.m.b.H.: *See—*
Moder, Helmut, 4,027,641.
Nieskens, Antonius; Slenders, Petrus; and Palmkoeck, Christian, 4,027,459.
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Robert Hain Associates, Inc.: *See—*
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Robert, Louis: *See—*
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Robertshaw Controls Company: *See—*
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Ochsner, Rolf H., 4,028,461.
Perkins, Charles H., 4,027,700.
Willson, James R.; and Tyler, Hugh J., 4,028,736.
Wolfe, Denis G., 4,027,689.

Robertson, George Heddle, to Ciba-Geigy Corporation. Pigment dispersions. 4,028,128, Cl. 106-308.00Q.

Robie, Susan P.: *See—*
Millard, Ben; and Robie, Susan P., 4,028,281.

Robin, Michael; and Schulte, Sheldon R., to Ashland Oil, Inc. Hindered phenol amines. 4,028,416, Cl. 260-570.50P.

Robitschek, Emmerich: *See—*
Greenwood, John H.; and Robitschek, Emmerich, 4,027,865.

Rochlitz, Jurgen; and Zunker, Reinhard, to Hoechst Aktiengesellschaft. Diamine condensation products in double layer photoconductive recording elements. 4,028,102, Cl. 96-1.500.

Rockaway Corporation: *See—*
Varga, Leroy M.; and Fitch, Robert B., 4,027,578.

Rocket Research Corporation: *See—*
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Rockwell International Corporation: *See—*
Hagon, Peter J.; and Haworth, John, 4,028,639.

Roffelsen, Franciscus, to N.V. Spiro Research. Device for venting and aerating closed circulatory water flow systems. 4,027,691, Cl. 137-202.000.

Rogers, Jimmy Dale; and Creecy, Michael Earl, to United States of America, Navy. Drive control to prevent simultaneous conduction in push-pull switching amplifier. 4,028,633, Cl. 330-118.000.

Rogers, Kenneth A. Golf iron manufacture. 4,027,885, Cl. 273-169.000.

Rohm and Haas Company: *See—*
McNulty, Patrick J.; and Warner, Harlow L., 4,028,084.

Rohr Industries, Inc.: *See—*
Garry, Frederick W., 4,027,737.

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Roldan, Cristobal Martinez: *See—*
Jarque, Ricardo Granados; Cartes, Juan Bosch; Cabiro, Jorge Canals; Roldan, Cristobal Martinez; and Peinado, Rabadan, 4,028,371.

Rollei-Werke Franke & Heidecke: *See—*
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Rolls-Royce (1971) Limited: *See—*
Carlisle, Denis Richard, 4,028,044.

Romanin, Bruno, to Campagnie des Brevets et Applications Industrielles Etablissement. Method and device for dummy shuttle operation on conventional shuttle looms. 4,027,704, Cl. 139-438.000.

Romer, Ludwig: *See—*
Keller, Herbert; Krieg, Bruno; and Romer, Ludwig, 4,027,996.

Rondeau, Henry S. Spray bonding of nickel aluminum and nickel titanium alloys. 4,027,367, Cl. 428-652.000.

Roper Corporation: *See—*
De Weese, Raymond Paul; and Kumpfer, Beverly D., 4,028,519.
Torrey, Sumner H., 4,028,520.
Uyeda, Frederick K.; and Austin, Buddy J., 4,028,521.

Rosback, Donald H.: *See—*
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Roseberg, Harry G. Clothing hanger. 4,027,812, Cl. 223-96.000.

Rosen, George; Carlick, Daniel J.; and Reiter, Ralph H., to Sun Chemical Corporation. Photopolymerizable compounds and compositions comprising the product of the reaction of a resin and a polycarboxy-substituted benzophenone. 4,028,204, Cl. 204-159.140.

Rosenbaum, Walter Steven, to International Business Machines Corporation. Digital reference hyphenation matrix apparatus for automatically forming hyphenated words. 4,028,677, Cl. 340-172.500.

Rosenberg, John D. Franchise board game. 4,027,882, Cl. 273-134.0AT.

Rosenblum, Jesse. Vibratory separator screen and method of manufacture. 4,028,230, Cl. 209-403.000.

Rosenfeld, Jerome E. Dry transfer product and process. 4,028,165, Cl. 156-234.000.

Rosenkilde, Hakon. Electromagnetic sound generator. 4,028,503, Cl. 179-115.00R.

Rosinski, Klaus D.; and Schroer, John W., to Owens-Corning Fiberglas Corporation. Method for analysis of treated glass fibers. 4,028,472, Cl. 427-8.000.

Ross, John W.: *See—*
Cassidy, Stephen; Baboian, Robert; Frechette, Raymond A.; Haynes, Gardner S.; and Ross, John W., 4,028,064.

Rossmy, Gerd: *See*—
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Roszler, John J., to Brooks & Perkins, Incorporated. Production of neutron shielding material. 4,027,377, Cl. 29-420.500.
Rothgordt, Ulf: *See*—
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Roto-Master, Inc.: *See*—
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Rottleb, Dieter, to Gutermann & Co. Aktiengesellschaft. Spool for thread. 4,027,831, Cl. 242-125.100.
Rottloff, Gunther; Sundermann, Rudolf; Grigat, Ernst; and Putter, Rolf, to Bayer Aktiengesellschaft. Process for the production of polyfunctional cyanic acid esters. 4,028,393, Cl. 260-453.00P.
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Roussopoulos, Paul: *See*—
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Rouvre, Philippe; and Augello, Daniel Jean, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Central circuit control plates for automotive vehicles. 4,028,738, Cl. 361-403.000.
Royer, Robert Dale; and Schwab, Thomas Frank, to Bell Telephone Laboratories, Incorporated. Digital computer arrangement for high speed memory access. 4,028,663, Cl. 340-172.500.
Rubin, Gerald, to Exxon Research and Engineering Company. Elimination of pinking in vinyl asbestos formulations. 4,028,328, Cl. 260-42.440.
Rubino, Andrew M.; Jones, John L.; and Bretschneider, Edward S., to Armour Pharmaceutical Company. Methods of making basic zirconium complexes. 4,028,390, Cl. 260-429.300.
Rucker, Dugan Allan: *See*—
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Rufenacht, Kurt: *See*—
Meyer, Willy; Bohner, Beat; Dawes, Dag; and Rufenacht, Kurt, 4,028,377.
Ruggiero, Arthur. Multi-face clamp for manufacturing or regluing of drawers, chairs or the like. 4,027,866, Cl. 269-41.000.
Ruiz, Gilbert G. Patient restraint for X-ray studies of infants. 4,027,869, Cl. 269-328.000.
Runfeldt, Nils Harald: *See*—
Wennberg, Olov Carl Gustav; and Runfeldt, Nils Harald, 4,027,378.
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Russell, John Xavier, to Babcock & Wilcox Company, The. Pot broaching machine. 4,027,574, Cl. 90-10.000.
Rutherford, Harry Wayne. Tank bottom assembly apparatus. 4,027,374, Cl. 29-256.000.
Ruthroff, Clyde Leslie: *See*—
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Ruumpol, Geurt J., to Veco Beheer Electroforming/Photo Etching B.V. System for passing products to be treated through a machine. 4,028,605, Cl. 318-696.000.
Ryckman, William D., Jr., to General Electric Company. Apparatus for heating dispensable flowable material. 4,027,786, Cl. 222-146.0HA.
Ryobi, Ltd.: *See*—
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S & C Electric Company: *See*—
Schmunk, E. William; and Tobin, Thomas J., 4,028,656.
Saam, Charles W., to Harter Corporation. Method of making a chair leg base. 4,027,364, Cl. 29-150.000.
Saburi, Akio, to Nippon Electric Company, Ltd. Acquisition technique for time division multiple access communication system. 4,028,497, Cl. 179-15.0BS.
Sachs, Elmer B. Airplane. 4,027,835, Cl. 244-101.000.
Sado, Yukio: *See*—
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Safar, Petr; Langr, Josef; Kolar, Miloslav; and Nosek, Stanislav, to Vyzkumny Ustav Bavlnarsky. Strand-braking apparatus. 4,027,705, Cl. 139-450.000.
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Saich, William George, to Solartron Electronic Group Limited, The. Data terminals having interactive keyboards and displays and data processing apparatus incorporating such terminals. 4,028,695, Cl. 340-365.00R.
St. Clair, Theodore A., to Textron, Inc. Methods and apparatus for proof testing gas meters. 4,027,523, Cl. 73-3.000.
Saint-Gobain Industries: *See*—
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Saint-Lot, Armand, to Thomson-CSF. Electronic switching arrangement for a homing and traffic radio system. 4,028,624, Cl. 325-23.000.
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Saito, Yuichi, to Nissan Motor Co., Ltd. Pressure reducer device. 4,027,923, Cl. 303-6.00C.
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Sakai, Shuzo, to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo. Process for the production of saccharified starch products. 4,028,186, Cl. 195-31.00R.
Sakai, Toshiyuki; Matsuo, Koichi; and Tochio, Yukihiro, to Mitsui Mining & Smelting Co., Ltd. Process for preparing catalytic materials for purifying exhaust gas and catalytic materials prepared thereby. 4,028,275, Cl. 252-466.0PT.
Sakamoto, Minoru. Locking jalousie frame. 4,027,430, Cl. 49-403.000.
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Salter, Lucien; and Maincent, Gabriel. Apparatus and method for display of images. 4,028,732, Cl. 358-289.000.
Salto, Rinaldo, to Ing. C. Olivetti & C., S.p.A. Keyboard for office machines. 4,027,763, Cl. 197-16.000.
Salvatore, Michael. Method of lasting shoe uppers to a last and lasted shoe uppers and articles of footwear produced thereby. 4,027,406, Cl. 36-83.000.
Samis, Philip Lawrence. Positive identification method and structure. 4,027,391, Cl. 32-1.000.
Samuels, W. Edward. Gas-energized liquid transfer and control system. 4,027,791, Cl. 222-396.000.
Sanders Associates, Inc.: *See*—
Misek, Victor A., 4,027,970.
Mortimer, Thomas J., 4,028,661.
Stevens, Robert R., 4,028,699.
Sanderson, William A., to Burlington Industries, Inc. Process for preparing m-aminobenzenephosphonic acid. 4,028,403, Cl. 260-502.500.
Sando Iron Works Co., Ltd.: *See*—
Sando, Yoshikazu; and Ishidoshiro, Hiroshi, 4,027,507.
Sando, Yoshikazu; and Ishidoshiro, Hiroshi, to Sando Iron Works Co., Ltd. Air-and-liquid combined sealing device for high pressure steamer. 4,027,507, Cl. 68-5.00E.
Sandoval, Jorge: *See*—
Domic, Esteban; Sfeir, Albert; and Sandoval, Jorge, 4,028,462.
Sapp, Lawrence G.; Slappey, James F.; and Nixon, C. Bart. Unitizing frame for a pallet. 4,027,599, Cl. 108-55.100.
Sargentini, Enrico; and Carena, Ugo, to Ing. C. Olivetti & C., S.p.A. Inking device for the type-carrier element of a calculating machine. 4,027,766, Cl. 197-151.000.
Sato, Akira; Ikeda, Tadashi; Sueyoshi, Tohru; Nakamura, Yasuharu; and Shimada, Takeo, to Fuji Photo Film Co., Ltd. Photographic sensitive materials having a dyed layer. 4,028,112, Cl. 96-84.00R.
Sato, Akira: *See*—
Hinata, Masanao; Takei, Haruo; Sato, Akira; Iwamoto, Atsuo; and Hayashi, Jun, 4,028,115.
Sato, Haruto. Swimming glove. 4,027,347, Cl. 9-308.000.
Sato, Hisatake: *See*—
Tsuchiya, Shozo; Sato, Hisatake; Oshima, Akio; and Hayashi, Hideo, 4,028,291.
Sato, Shigetake; Kurahashi, Suminobu; Okuyama, Toru; and Hamada, Noboru, to Bridgestone Tire Company Limited. Process for continuous preparation of a foam polyamide. 4,028,287, Cl. 260-2.50N.
Sato, Tadashi: *See*—
Hamaguchi, Sachihiko; Oomura, Ikuo; Sato, Tadashi; and Wada, Hisashi, 4,028,687.
Satzinger, Gerhard; and Hechtfischer, Gustav, to Warner-Lambert Company. Process for substituted cyclohexenes and its products. 4,028,398, Cl. 260-471.00A.
Sauerbrunn, Robert Dewey: *See*—
Livingston, Richard Donnan; and Sauerbrunn, Robert Dewey, 4,028,443.
Savarimuthu, Sundar. Reinforcing hole punch device. 4,028,170, Cl. 156-513.000.
Sawa, Toshio: *See*—
Nishimura, Shigeoki; Sawa, Toshio; Otani, Kouji; and Kikkawa, Seiichi, 4,028,237.
Sawada, Shuzo: *See*—
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Sawada, Yuji: *See*—
Kawarai, Takashi; Sawada, Yuji; Takemoto, Katsumi; and Mikami, Sadao, 4,027,823.
Sawyer, Philip Nicholas; and Stanczewski, Boguslaw, to Interface

Biomedical Laboratories Corporation. Endosteal bionic tooth and implantation method. 4,027,392, Cl. 32-10.00A.

Saxon, Robert: *See—*
Li, Tsi Tieh; and Saxon, Robert, 4,028,305.

Sayigh, Adnan A. R.; Sun, Kwok K.; and Ulrich, Henri, to Upjohn Company, The. Process for the purification of MDA. 4,028,361, Cl. 260-570.00D.

SCA Development Aktiebolag: *See—*
Bohlin, Karl Gunnar; Eriksson, Karl Rune; and Gustafsson, Carl-Erik, 4,027,736.

Schaaf, Robert, to Air Filters, Inc. Vacuum cleaner filter bag. 4,028,074, Cl. 55-366.000.

Schachte, John J.: *See—*
Zankl, Frank; Kirkham, Edward E.; Stobbe, Richard E.; and Schachte, John J., 4,028,599.

Schaefer, Carl W. D.; Schaefer, Richard L.; and Kennedy, Gordon F., to Frank W. Schaefer Inc. Metal melting furnace with alternate heating systems. 4,027,862, Cl. 266-160.000.

Schaefer, Hermann Reinhold: *See—*
Flowers, Theodore Robert; and Schaefer, Hermann Reinhold, 4,027,348.

Schaefer, Richard L.: *See—*
Schaefer, Carl W. D.; Schaefer, Richard L.; and Kennedy, Gordon F., 4,027,862.

Schafer, Inge: *See—*
Bite, Pal; Moravcsik, Imre; Schafer, Inge; Horvath, Gyula; Mehes-falvi nee Vajna, Zsuzsanna; Borvendeg, Janos; and Hermann nee Szente, Ilona, 4,028,348.

Schafer, Walter; Wagner, Kuno; and Muller, Hans-Jurgen, to Bayer Aktiengesellschaft. Process for the production of polyureas. 4,028,310, Cl. 260-77.5CH.

Schaidle, William J.; and Stewart, Patrick H., to Core-Lube, Inc. Binding resin for foundry sand and catalyst therefor. 4,028,271, Cl. 252-429.00R.

Schall, William L.: *See—*
Kahn, Henry; and Schall, William L., 4,028,329.

Schaller, Karl: *See—*
Failla, Henri; Schaller, Karl; and Vidard, Michel, 4,028,177.

Schaub, Robert Eugene; and Weiss, Martin Joseph, to American Cyanamid Company. 16,16-Spirocycloalkyl prostaglandin derivatives. 4,028,396, Cl. 260-468.00D.

Schei, Asle: *See—*
Fahlen, Nils; and Schei, Asle, 4,028,592.

Scheibel, Edward G., to Suntech, Inc. Cascade refrigeration system. 4,028,079, Cl. 62-335.000.

Schenker, Barry A.: *See—*
Lewis, David L.; Franks, C. Richard; and Schenker, Barry A., 4,028,215.

Schering Aktiengesellschaft: *See—*
Wenzel, Martin; and Langheim, Detlef, 4,028,389.

Schiel, Christian, to J. M. Voith GmbH. Cylinder machine having positive pressure chambers adjacent an outer band. 4,028,175, Cl. 162-274.000.

Schlatter, James M.: *See—*
Jones, David A., Jr.; Schlatter, James M.; Mikulec, Richard A.; Reuter, Judith A.; and Mazur, Robert H., 4,028,319.

Schlegel Corporation: *See—*
Lind, Earl V., 4,028,456.

Schlicker, Heinrich August, to AB Volvo Penta. Hydraulic servo-brake arrangement for double circuit brakes. 4,027,922, Cl. 303-6.00R.

Schloss, Alden. Record-reproduce device for flash cards. 4,027,405, Cl. 35-35.00C.

Schlotman, Walter F., to Stanadyne, Inc. Faucet valve and seal therefor. 4,027,851, Cl. 251-172.000.

Schmelzer Corporation: *See—*
Benjamin, Benjamin C., 4,027,634.

Schmider, Paul, to Beckman Instruments G.m.b.H. Apparatus for doping semiconductors in centrifuge. 4,027,622, Cl. 118-49.500.

Schmidt, Eckart W., to Rocket Research Corporation. Composite catalyst bed and method for making the same. 4,027,476, Cl. 60-218.000.

Schmidt, Gunter: *See—*
Fink, Hans-Ferdi; Fritsch, Herwig; Koerner, Gotz; Rossmy, Gerd; and Schmidt, Gunter, 4,028,218.

Schmidt, Warren E.: *See—*
Finney, Robert H.; and Schmidt, Warren E., 4,028,002.

Schmunk, E. William; and Tobin, Thomas J., to S & C Electric Company. High voltage fuse with outer heat-shrinkable sleeve. 4,028,656, Cl. 337-186.000.

Schmutz, Hermann: *See—*
Huschka, Hans; Schmutz, Hermann; and Vygen, Peter, 4,028,181.

Schnatmeyer, Hans; and Schutzer, Gerhard, to Gustav F. Gerdts KG. Check valve. 4,027,695, Cl. 137-527.000.

Schneider, Abraham, to Suntech, Inc. Explosive composition containing alkyl ethers having high densities. 4,028,153, Cl. 149-46.000.

Schneider, Abraham: *See—*
Borkowski, Walter L.; and Schneider, Abraham, 4,028,152.

Schneider, Richard: *See—*
Rendell, Stanley E.; and Schneider, Richard, 4,027,570.

Schnell, William J.: *See—*
Miller, Jimmy L.; and Schnell, William J., 4,028,253.

School Health Supply Company: *See—*
Good, Carleton R., 4,027,954.

Schopp, Hans, to Ellenberger & Poensgen GmbH. Calorimetric flow monitor. 4,028,689, Cl. 340-239.00R.

Schossow, George W. Electrically grounded vaporizer structure. 4,028,526, Cl. 219-295.000.

Schossow, George W. Safety circuit for electrical equipment. 4,028,594, Cl. 307-326.000.

Schott, John R.: *See—*
Piech, Kenneth R.; and Schott, John R., 4,027,980.

Schroeder, Lloyd A. Model aircraft propulsion. 4,027,422, Cl. 46-78.000.

Schroeder, William Edward: *See—*
Gewartowski, James Walter; and Schroeder, William Edward, 4,028,637.

Schroer, John W.: *See—*
Rosinski, Klaus D.; and Schroer, John W., 4,028,472.

Schubert, Anthony E.: *See—*
McKee, William H.; and Schubert, Anthony E., 4,027,521.

Schulman, Joseph H.; and Moore, Robert F., to Pacesetter Systems, Inc. Myocardial lead. 4,027,677, Cl. 128-418.000.

Schulte, Sheldon R.: *See—*
Robin, Michael; and Schulte, Sheldon R., 4,028,416.

Schultz, James J.; and Van Pelt, Vincent J., to Tennessee Valley Authority. Fertilizer processes incorporating scrubbed flue gas sludge byproduct. 4,028,087, Cl. 71-25.000.

Schuplin, Jerome T., to Fastway Fasteners, Inc. Hold down clip for ceiling tile in grid-type ceiling. 4,027,454, Cl. 52-714.000.

Schuster, Stanley E.: *See—*
Cook, Peter William; and Schuster, Stanley E., 4,028,694.

Schutzer, Gerhard: *See—*
Schnatmeyer, Hans; and Schutzer, Gerhard, 4,027,695.

Schwab, Thomas Frank: *See—*
Royer, Robert Dale; and Schwab, Thomas Frank, 4,028,663.

Schwan, Thomas J., to Morton-Norwich Products, Inc. 2-Diethoxyethyl(dimethyl)(2-(2,4-diphenyl-5-pyrimidyl)-2-oxoethyl)ammonium bromide. 4,028,359, Cl. 260-256.40R.

Schwartz, Rene, to Groupe Europeen pour la Technique des Turbines a Vapeur G.E.T.T. S.A. Fixing arrangement for a guide part of a fixed casing on a rotating machine. 4,027,998, Cl. 415-219.00R.

Schwarz, Alois: *See—*
Weiland, Emil; Schwarz, Alois; and Frommlet, Hubert, 4,028,000.

Schwarz, Hans-Helmut; and Immel, Otto, to Bayer Aktiengesellschaft. Method for processing lactam residues which contain boric acid. 4,028,347, Cl. 260-239.30A.

Schwarzmann, Frederick G.: *See—*
Petersen, Arthur W.; Cimiluca, Arthur; and Hirschberger, Leonard, 4,028,261.

Schweizerische Aluminium AG: *See—*
Theobald, Reiner; and Heubner, Ulrich, 4,027,716.

Schwibach, Wilhelm: *See—*
Eichinger, Johann; and Schwibach, Wilhelm, 4,027,553.

Scott, Marion L., to United States of America, Navy. IR imaging with surface wave readout. 4,028,548, Cl. 250-330.000.

Scott, Norman H., to UOP Inc. Fractionation column with vapor channeling baffles. 4,028,191, Cl. 202-158.000.

Scott Paper Company: *See—*
Millard, Ben; and Robie, Susan P., 4,028,281.

Scrivens, George W., to Johnson & Johnson. Cardiovascular drape. 4,027,665, Cl. 128-132.00D.

SECIM: *See—*
Quehen, Andre, 4,027,725.

Seibel, Julia K. Drag reducing fairing for landing gear. 4,027,836, Cl. 244-103.00R.

Seibu Polymer Kasei Kabushiki Kaisha: *See—*
Tanikawa, Takayoshi, 4,027,902.

Seide, Adolf, to Werner & Pfleiderer. Screw extruder and calender assemblage. 4,028,031, Cl. 425-147.000.

Seidl, Joachim: *See—*
Seidl, Maximilian R.; Seidl, Joachim; and Henry, Walton M., 4,027,590.

Seidl, Maximilian R.; Seidl, Joachim; and Henry, Walton M., to Avery International Corporation. Label, ticket and tag printing machine with interchangeable tape supply and feeder magazines. 4,027,590, Cl. 101-288.000.

Seiler, Claus-Dieter: *See—*
Vahlensieck, Hans-Joachim; Seiler, Claus-Dieter; and Kotzsch, Hans-Joachim, 4,028,384.

Seiler, Hartmut: *See—*
Streit, Klaus; Kugelmann, Adolf; and Seiler, Hartmut, 4,028,564.

Seki, Kenji; Kimura, Akio; Asahi, Satoshi; and Takeshita, Yasuhiro, to Idemitsu, Kosan Kabushiki-Kaisha (Idemitsu Kosan Co., Ltd.). Process for producing block copolymers. 4,028,435, Cl. 260-878.00B.

Selam, Gabriel. Device for detecting and positioning a mobile object capable of moving in at least one given path. 4,028,603, Cl. 318-587.000.

Sels, Francis Jeanne: *See—*
Berendsen, Jules Robert; Pollet, Robert Joseph; Philippaerts, Herman Adelbert; Sels, Francis Jeanne; and Willems, Jozef Frans, 4,028,110.

Sensoli, Robert A.: *See—*
Cole, Gerald S.; Kovacs, Bela V.; Sensoli, Robert A.; and Smartt, Herschel B., 4,028,099.

Sera, Hidefumi; Nagao, Kameji; and Ishii, Tsumoru, to Fujii Photo Film Co., Ltd. Method of hardening gelatin using sulfonyl compounds. 4,028,320, Cl. 260-117.000.

Sezaki, Tamotsu: *See—*
Ikeda, Tsunemi; and Sezaki, Tamotsu, 4,027,617.

Sfeir, Albert: *See—*
Domic, Esteban; Sfeir, Albert; and Sandoval, Jorge, 4,028,462.

Shaduya, Vladimir Leontievich: *See—*
Chachin, Viktor Nikolaevich; Zdor, Gennady Nikolaevich; Zhuravsky, Alexandr Julyanovich; Golovkina, Elena Yakovlevna; and Shaduya, Vladimir Leontievich, 4,027,515.

Shakespeare Company: *See—*
Derrick, Danny O., 4,027,741.

Shand, Kenneth James. Apparatus and method for increasing speed of horses. 4,027,462, Cl. 54-71.000.

Sharp, Benny H., to Western Electric Company, Inc. Method of and video system for identifying different light-reflective surface areas on articles. 4,028,728, Cl. 358-106.000.

Sharp, Donald E.: *See—*
Yanko, William H.; and Sharp, Donald E., 4,028,410.

Shaw, Victor Henry, to Plessey Handel und Investments A.G. Illuminated optical viewers. 4,027,957, Cl. 353-21.000.

Sheehan, John Timothy: *See—*
Bodanszky, Miklos; and Sheehan, John Timothy, 4,028,315.

Shell Oil Company: *See—*
Goppel, Johan M.; and Chant, Peter R., 4,028,477.
van den Brink, Marinus J.; Austermuhle-Bertola, Helena; and Kramer, Petrus A., 4,028,418.

Shelton, Claude M.: *See—*
Bogan, Richard T.; and Shelton, Claude M., 4,028,436.

Shelton, Herbert P. Solar energy operated air compressor. 4,028,008, Cl. 417-52.000.

Shelton, Jack: *See—*
Leasure, William; Garcia, Luis; Reifel, Charles; and Shelton, Jack, 4,027,579.

Shemonaev, Alexandr Tikhonovich; Cherny, Dmitry Grigorievich; Genis, Semen Naumovich; and Vishnitsky, Igor Konstantinovich. Transverse frame of industrial building carcass. 4,027,438, Cl. 52-27.000.

Sherrill, Frank C., to Ellison Company, Inc., The. Loom reed. 4,027,702, Cl. 139-192.000.

Shibata, Norio: *See—*
Goto, Kenji; Shibata, Norio; and Hashiguchi, Yukihide, 4,027,635.

Shigeta, Yoshihiro; Suzaki, Kuniyoshi; and Ogiso, Mitsutoshi, to Canon Kabushiki Kaisha. System for controlling reproduction of audio tape in synchronism with projection of video film. 4,027,958, Cl. 353-26.00A.

Shiina, Naonori: *See—*
Hashimoto, Makoto; Uehara, Shinzi; Sugita, Tadashi; and Shiina, Naonori, 4,028,448.

Shikano, Yoshiro; and Ueoka, Yasuhiro, to Mitsubishi Denki Kabushiki Kaisha. Cooling device for heat generation member. 4,028,723, Cl. 357-82.000.

Shikano, Yoshiro: *See—*
Kobayashi, Gai; Shikano, Yoshiro; and Yano, Masao, 4,027,728.

Shikasho, Satoru: *See—*
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Shima, Masao: *See—*
Togo, Masaaki; Shima, Masao; and Mochizuki, Kiyoshi, 4,028,604.

Shimada, Takeo: *See—*
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Shimada, Toshio: *See—*
Hujimori, Masao; Nakajima, Shigeo; Takahashi, Ken; Ito, Tsunetoshi; Shimada, Toshio; and Endo, Hajime, 4,027,918.

Shimano Industrial Company, Limited: *See—*
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Nagano, Masashi, 4,027,542.

Shimizu, Takayuki: *See—*
Fujisawa, Michio; Matsumoto, Hatsuo; Sawada, Shuzo; Yamane, Kiyoshi; Kato, Hideo; Shimizu, Takayuki; and Kato, Shigeo, 4,027,345.

Shimizu, Yoshiyuki: *See—*
Mori, Ikuo; and Shimizu, Yoshiyuki, 4,027,951.

Shimogawa, Toshiaki; Morita, Masayuki; and Kawaharazaki, Takashi, to Nippon Soken, Inc. Seat belt system for vehicle. 4,027,905, Cl. 280-746.000.

Shinoda, Nobuhiko: *See—*
Kawamura, Masaharu; Sakurada, Nobuaki; Shinoda, Nobuhiko; Ito, Tadashi; Ito, Fumio; and Murakami, Hiroyashu, 4,028,712.

Shinozuka, Isao: *See—*
Doi, Tsunesuke; Komoto, Hiroshi; Chono, Masazumi; Inoue, Akira; Saito, Kazuaki; and Shinozuka, Isao, 4,028,055.

Shiomura, Tetsunosuke; Ito, Akiro; Morimoto, Yoshio; and Iwao, Tetsuya, to Mitsui Toatsu Chemicals, Incorporated. Production of olefin polymers and novel catalysts therefore. 4,028,481, Cl. 526-142.000.

Shionogi & Co., Ltd.: *See—*
Yukinaga, Hisajiro; Sumimoto, Shinzaburo; Ishizuka, Ichiro; and Sugita, Jitsuo, 4,028,376.

Shiraki, Masaru: *See—*
Okada, Akira; Iriyama, Keiji; and Shiraki, Masaru, 4,028,217.

Shorrock Developments Limited: *See—*
Buckley, Norman Ian; and Wilson, Edward, 4,028,690.

Shortes, Samuel R.; and Millis, Edwin Graham, to Texas Instruments Incorporated. Method and apparatus for cleaning the surface of a semiconductor slice with a liquid spray of de-ionized water. 4,027,686, Cl. 134-33.000.

Showa Denko Kabushiki Kaisha: *See—*
Ueshima, Takashi; Tanaka, Yasuzi; and Kobayashi, Shoichi, 4,028,482.

Shufflebarger, Earl D.; Kish, Edward E.; Boylan, John R.; Diehl, George D.; Gallagher, Bernard J.; and Tobbe, William P., to Nupro Company. Fluid filter. 4,028,254, Cl. 210-447.000.

Shufflebarger, Earl D.: *See—*
Murauskas, Donald J.; Kish, Edward E., Jr.; Cunningham, Frank M.; Gallagher, Bernard J.; and Shufflebarger, Earl D., 4,028,248.

Shutoh, Masamichi, to Nippon Electric Company, Ltd. Driving circuit for selecting control cells of a gas discharge panel by transistors through diodes. 4,028,584, Cl. 315-169.0TV.

Sickel, Helmut, deceased (by Sickel, Liesbet, administrator), to Dr. Kuhn & Co. GmbH. Speech aid apparatus for laryngectomees. 4,028,492, Cl. 179-1.0AL.

Sickel, Liesbet, administrator: *See—*
Sickel, Helmut, deceased, 4,028,492.

Siegmund, Walter P.: *See—*
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Siemens Aktiengesellschaft: *See—*
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Siemens-Albis Aktiengesellschaft: *See—*
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Siempelkamp Giesserei KG: *See—*
Beckmann, Georg, 4,027,690.

Silverman, Herman, to KDI Sylvan Pools, Inc. Method of constructing swimming pools. 4,027,442, Cl. 52-309.400.

Simmons, James Almy: *See—*
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Simms, William D.: *See—*
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Simon, Helmut: *See—*
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Singer Company, The: *See—*
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SKF Industrial Trading and Development Company B.V.: *See—*
Kunkel, Heinrich; Brandenstein, Manfred; Olschewski, Armin; Finzel, Sigismund; Gossmann, Willi; and Horling, Peter, 4,027,932.

SKF Nova AB: *See—*
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Skowronski, Michael J.: *See—*
Hipchen, Donald E.; Skowronski, Michael J.; and Hagan, Joseph R., 4,028,158.

Skrydstrup, Ole, to Central Dynamics Ltd. Mix/effects switch arrangement and mix/effects switching system. 4,028,727, Cl. 358-181.000.

Slappey, James F.: *See—*
Sapp, Lawrence G.; Slappey, James F.; and Nixon, C. Bart, 4,027,599.

Slator, Damon T.; Bishop, Thomas R.; and Peil, Archie W., to Bowen Tools, Inc. Seal assembly. 4,027,816, Cl. 277-188.00R.

Slenders, Petrus: *See—*
Nieskens, Antonius; Slenders, Petrus; and Palmkoeck, Christian, 4,027,459.

Slingluff, Eugene L., to Krandex Corporation. Radiographic opaque and conductive stripped medical tubes. 4,027,659, Cl. 128-2.00M.

Sloss, Barry L.: *See—*
Stayner, Vance A.; and Sloss, Barry L., 4,028,134.

Sly, Howard M. Water actuated garbage compactor. 4,027,584, Cl. 100-218.000.

Smartt, Herschel B.: *See—*
Cole, Gerald S.; Kovacs, Bela V.; Sensoli, Robert A.; and Smartt, Herschel B., 4,028,099.

Smit Ovens Nijmegen B.V.: *See—*
Verhoeven, Gerardus H. Th. M.; and Stensen, Heinrich P., 4,028,052.

Smith, Bradley W.: *See—*
Kamath, G. Sanjiv; and Smith, Bradley W., 4,028,147.

Smith, Clay D.; and Keller, D. V., Jr., to Otisca Industries, Ltd. Methods of and apparatus for hydrocarbon recovery. 4,027,731, Cl. 166-267.000.

Smith, Earl T.: *See—*
Campagnuolo, Carl J.; Smith, Earl T.; and Dale, Ronald L., 4,027,593.

Smith, Edward Dyal: *See—*
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Smith, Gordon Marlon: *See—*
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Smith, Jack: *See—*
Taylor, Fredrick J.; Smith, Jack; and Pries, Thomas H., 4,028,673.

Smith, Joseph F. Uniroll false twist device and method. 4,027,467, Cl. 57-77.400.

Smith Kline & French Laboratories Limited: *See—*
White, George Raymond, 4,028,379.

Smith, Lawrence: *See—*
United States of America, National Aeronautics and Space Administration; Smoot, George F.; Pope, William L.; and Smith, Lawrence, 4,027,494.

Smith, Peter William: *See—*
Gloge, Detlef Christoph; Smith, Peter William; and Chinnock, Edwin LeRoy, 4,027,814.

Smith, Randlow; Jones, Henry B.; Jobsis, Adrianus C.; and Deloney, Hugh C., to Texaco Inc. Methods and multiple thermocouple support assembly. 4,028,139, Cl. 136-230.000.

SmithKline Corporation: *See—*
Blackburn, Dale W., 4,028,355.
Levinson, Sidney Harry; and Mendelson, Wilford Lee, 4,028,408.

Smoot, George F.: *See—*
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Snell, George J.: *See—*
Sze, Morgan C.; and Snell, George J., 4,028,221.

Snook, Stephen R.: *See—*
Parks, Jill J.; and Snook, Stephen R., 4,028,701.

Snow, John E., to Champion International Corporation. Product processing system with price printer. 4,028,537, Cl. 235-61.90R.

Snyder, Lloyd R.; Oberhardt, Bruce J.; and Olich, Jack, to Technicon Instruments Corporation. Substance separation technique. 4,028,056, Cl. 23-230.00B.

Snyder, Robert P.; and Deja, Edmund P., to Trippensee Corporation. Latch releasing mechanism for water samplers. 4,027,538, Cl. 73-425.40R.

Sobel, Jay E.: *See—*
Carlson, David H. J.; Verachtert, Thomas A.; and Sobel, Jay E., 4,028,269.

Societe Anonyme D.B.A.: *See—*
Gerard, Jean-Louis, 4,027,751.

S.A. des Anciens Etablissements Paul Wurth: *See—*
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Societe Anonyme des Equipements S.E.I.M.: *See—*
Terrone, Andre, 4,028,573.

Societe Chimique des Charbonnages - CdF Chimie: *See—*
Le Brasseur, Genevieve, 4,028,480.

Societe d'Etude et d'Application des Techniques Nouvelles NEO-TEC: *See—*
Honore, Etienne A. H.; and Torcheux, Emile L. G., 4,028,703.

Societe d'Etudes de Machines Thermiques: *See—*
Froeliger, Jacques Ernest Maurice, 4,027,365.

Societe Generale de Constructions Electriques et Mecaniques (Alsthom): *See—*
Alexandre, Philippe, 4,027,487.

Societe Les Coffrages Madernes: *See—*
Caplat, Sylvain, 4,027,846.

Sofianek, Joseph C.: *See—*
Kurtz, Donald R.; Popadick, Carl C.; Sofianek, Joseph C.; and Taiento, Joseph L., 4,028,514.

Soga, Tsunehiko: *See—*
Uchii, Jiro; Kodo, Masatsugu; Soga, Tsunehiko; and Morimoto, Yutaka, 4,028,070.

Sohma, Akio: *See—*
Kuroda, Michio; Namura, Kiyoshi; Kato, Fumio; Yamazaki, Yoshiaki; Iwasaki, Tutomu; Ishida, Akira; Sohma, Akio; and Imai, Tetsu, 4,028,006.

Solarex Corporation: *See—*
Lindmayer, Joseph, 4,028,151.

Solartron Electronic Group Limited, The: *See—*
Saich, William George, 4,028,695.

Solid State Systems, Inc.: *See—*
Mehaffey, Joseph H.; Mills, Edgar C.; and Ivester, J. Harold, 4,028,498.

Soltis, Frank Gerald: *See—*
Hoffman, Roy Louis; Kempke, William George; and Soltis, Frank Gerald, 4,028,670.

Solvay & Cie: *See—*
Giacopelli, Umberto, 4,028,208.

Somerville, Robert L. Feed box for liquid-solid mixtures. 4,027,760, Cl. 193-2.00R.

Sony Corporation: *See—*
Komatsu, Yasutoshi; and Yanagisawa, Yuzuru, 4,028,649.

Soo, Suk Suet: *See—*
Brennemann, Andrew Ernest; and Soo, Suk Suet, 4,028,493.

Sorgenfrei, Jurgen: *See—*
Weber, Gerald; and Sorgenfrei, Jurgen, 4,028,682.

Southwest Wheel and Manufacturing Company: *See—*
Steen, Buster M., 4,027,898.

Southwire Company: *See—*
Chia, E. Henry; Powers, Frank M.; and Chadwick, Kenneth E., 4,028,141.

Spanek, Denis C.: *See—*
Spanek, George; and Spanek, Denis C., 4,027,583.

Spanek, George; and Spanek, Denis C. Rack for supporting poultry and meat during roasting. 4,027,583, Cl. 99-421.00H.

Sparlin, Derry D., to Continental Oil Company. Seal assembly for fluid injection pump-down tools. 4,027,730, Cl. 166-156.000.

Spaulding, Vincent M.: *See—*
Key, Columbus B., Jr.; and Spaulding, Vincent M., 4,028,540.

Speer, Robert John: *See—*
Turner, David; and Speer, Robert John, 4,027,975.

Spence-Bate, Harry Arthur Hele. Camera mechanism. 4,027,968, Cl. 355-46.000.

Sperry Rand Corporation: *See—*
Albanese, Angelo P.; and Rattiner, David H., 4,028,697.
Flowers, Theodore Robert; and Schaefer, Hermann Reinhold, 4,027,348.
Young, Robert G., 4,027,815.

Sperti, George S.; and Berberich, Norbert J., Jr. Insertable dispensing capsule. 4,027,671, Cl. 128-272.000.

Spicers Limited: *See—*
Rigden, Peter Charles Edwin, 4,027,795.

Spinelli, Richard A.: *See—*
Hoppner, Werner F.; Spinelli, Richard A.; and Allis, Robert F., 4,027,963.

Spinosa, Dominic J.; and Camillucci, Edward R., to East/West Industries, Inc. Cutting implement. 4,027,386, Cl. 30-53.000.

Spohr, Karl: *See—*
Klein, Gunther; and Spohr, Karl, 4,027,556.

Sprague, James W.; Feldman, Daniel W.; and Veatch, Franklin, to Standard Oil Company. Manganese containing fuels. 4,028,065, Cl. 44-68.000.

Stade, Heinrich; and David, Klaus, to Stade, Heinrich. Self-sinking, axial passage foundation pile and method. 4,027,490, Cl. 61-53.500.

Staes, Daniel, to Rapistan, Incorporated. Code scanning system. 4,028,528, Cl. 235-61.11E.

Stahler, Theo, to Rheintechnik Weiland & Kaspar KG. Arrangement for conversion of foreign matter contained in water. 4,028,245, Cl. 210-151.000.

Stahlmann, Rudolf: *See—*
Hubsch, Gunter; Bendler, Hellmut; Stahlmann, Rudolf; and Gawlick, Heinz, 4,027,592.

Stal-Laval Turbin AB: *See—*
Andersson, Leif; and Singh, Ritindar, 4,027,699.

Stamicarbon B. V.: *See—*
Thoma, Jozef A.; and Stijfs, Petrus A. M. J., 4,028,362.

Stanadyne, Inc.: *See—*
Schlotman, Walter F., 4,027,851.

Stanczewski, Boguslaw: *See—*
Sawyer, Philip Nicholas; and Stanczewski, Boguslaw, 4,027,392.

Standard Oil Company: *See—*
Sprague, James W.; Feldman, Daniel W.; and Veatch, Franklin, 4,028,065.

Standard Oil Company (Indiana): *See—*
Nelson, James P., 4,028,308.
Puskas, Imre; and Cengel, John A., 4,028,264.

Standard Pressed Steel Co.: *See—*
Tambini, Angelo L.; and Wallace, Paul W., 4,027,530.

Stanley Electric Co., Ltd.: *See—*
Tashiro, Minoru; and Kimura, Shigeru, 4,028,611.

Starkweather, Gary K., to Xerox Corporation. Copier/raster scan apparatus. 4,027,961, Cl. 355-3.00R.

Starnes, William Herbert, Jr., to Bell Telephone Laboratories, Incorporated. Technique for stabilization of vinyl chloride polymers. 4,028,337, Cl. 260-45.75S.

Stauffer Chemical Company: *See—*
Baker, Don R.; Walker, Francis H.; and Letchworth, Peter E., 4,028,411.
Chang, Pei K., 4,028,317.
Teach, Eugene G., 4,028,093.

Stauter, John C.; and Um, Richard T., to UOP Inc. Recovery of manganese values. 4,028,463, Cl. 423-52.000.

Stayner, Robert A.; and Lowe, Warren, to Chevron Research Company. Wax-flux composition containing a succinimide salt of an alkylaryl sulfonic acid for soldering. 4,028,143, Cl. 148-23.000.

Stayner, Vance A.; and Sloss, Barry L. Reinforced resin filler compositions. 4,028,134, Cl. 106-291.000.

Stearns, Charles F., to United Technologies Corporation. Fuel control. 4,027,472, Cl. 60-39.28R.

Steen, Buster M., to Southwest Wheel and Manufacturing Company. Level load leaf spring drop axle. 4,027,898, Cl. 280-720.000.

Stefan, Stjepan: *See—*
Rausing, Ruben; Nedstedt, Gert; Holmstrom, Hakan; Palm, Lars-Erik; and Stefan, Stjepan, 4,027,455.

Steigerwald Strahltechnik GmbH: *See—*
Anderl, Peter; Geffcken, Monika; and Geissler, Joachim, 4,028,523.

Steinbatz, Alfred, to C. Reichert Optische Werke AG. Storage circuit for photometer. 4,027,981, Cl. 356-229.000.

Stella, Joseph A.; and Mason, Paul B., to Polaroid Corporation. Apparatus for facilitating engagement between film and film actuated pull-strip. 4,027,956, Cl. 352-130.000.

Stensen, Heinrich P.: *See—*
Verhoeven, Gerardus H. Th. M.; and Stensen, Heinrich P., 4,028,052.

Stepan, Jiri, to K. Loepfe Automation AG. Stripping device for wire, or the like. 4,027,557, Cl. 81-9.50R.

Stepe, Visvaldis A., to Caterpillar Tractor Co. Ground engaging element having a controlled cutting edge. 4,027,409, Cl. 37-142.00R.

Stephens, James R., to Phillips Petroleum Company. Liquid dispensing and vapor recovery system. 4,027,706, Cl. 141-301.000.

Stephenson, Robert Larry; and Colasanti, Arduino, to Allied Chemical Corporation. Flywheel and clutch mechanism for safety belt retractor. 4,027,829, Cl. 242-107.40A.

Sterling Drug Inc.: *See—*
Alexander, Ernest John; and Mooradian, Aram, 4,028,382.
Crounse, Nathan N.; and Ambrosiano, Nicholas A., 4,028,372.
Crounse, Nathan Norman, 4,028,357.
Daum, Sol J.; and Clarke, Robert L., 4,028,188.
Zenitz, Bernard L., 4,028,366.

Stevens, Carlile R. Battery analyzer. 4,028,616, Cl. 324-29.500.

Stevens, Robert R., to Sanders Associates, Inc. Search radar. 4,028,699, Cl. 343-9.000.

Stewart, Patrick H.: *See—*
Schaidle, William J.; and Stewart, Patrick H., 4,028,271.

Stewart-Warner Corporation: *See—*
Hanebuth, Paul N., 4,027,501.

Stiftelsen Isotoptekniska Laboratoriet: *See—*
Christell, Adolf Ragnar Roland Umberto Einarsson; Koski, Kaijo Aatto Matias; and Ljunggren, Knut Lennart, 4,028,267.

Stigall, Robert E.: *See—*
Hartmann, Clinton S.; and Stigall, Robert E., 4,028,648.

Stijfs, Petrus A. M. J.: *See—*
Thoma, Jozef A.; and Stijfs, Petrus A. M. J., 4,028,362.

Stiller, Armin; and Borejko, Stefan, to Rollei-Werke Franke & Heidecke. Arrangement for supplying a load with controlled current from an alternating current source. 4,028,613, Cl. 323-19.000.

Stine, Laurence O.; and Ward, Dennis J., to Universal Oil Products Company. Simulated moving bed reaction process. 4,028,430, Cl. 260-683.430.

Stobbe, Richard E.: *See—*
Zankl, Frank; Kirkham, Edward E.; Stobbe, Richard E.; and Schachte, John J., 4,028,599.

Stock, Horst: *See—*
Ellbrunner, Adalbert; Priewasser, Georg; Georg, Friedrich; and Stock, Horst, 4,028,137.

Stockman, Robert M., to American Radionic Co., Inc. Multi-voltage capacitor section. 4,028,595, Cl. 361-328.000.

Stoll, Mark Steven, to Liberty Carton Co. Self locking container. 4,027,818, Cl. 229-37.00R.

Stoller, Benjamin B.; and Azzolini, John C., Jr. Method and apparatus for the production of spawn. 4,027,427, Cl. 47-1.100.

Stone, G W (Charles), to Agriculture Research Incorporated. Cotton harvesting machine. 4,027,464, Cl. 56-30.000.

Stone, Milton, to Pettibone Corporation. Automatic control of liquid addition to a mixture by power sensing. 4,027,859, Cl. 259-18.000.

Stoner, Eugene M., to Ares, Inc. Ammunition magazine. 4,027,415, Cl. 42-50.000.

Storey, Edwin C., to General Motors Corporation. Dual sensor closed loop fuel control system having signal transfer between sensors during warmup. 4,027,477, Cl. 60-276.000.

Strasser, Jurgen H.: *See—*
Chiu, Tony T.; and Strasser, Jurgen H., 4,027,450.

Stratmann, Josef: *See—*
Bender, Martin; Knappstein, Johannes; and Stratmann, Josef, 4,028,192.

Stratton, Michael G., to GTE Sylvania Incorporated. Plural beam electron gun assembly. 4,028,581, Cl. 313-414.000.

Streifert, Keith L., to Carrier Corporation. Flexible damped bearing support. 4,027,931, Cl. 308-15.000.

Streit, Klaus; Kugelmann, Adolf; and Seiler, Hartmut, to Robert Bosch G.m.b.H. Compensated monolithic integrated current source. 4,028,564, Cl. 307-310.000.

Strempel, Willy, to Ultratek International, Inc. Argon bath induction casting system. 4,027,719, Cl. 164-51.000.

Stricker, David M.: *See—*
Bennett, Robert F.; Brouwer, Nicholaas L.; and Stricker, David M., 4,027,527.

Stroh, Thomas L.: *See—*
Dukes, Glenn V.; and Stroh, Thomas L., 4,027,813.

Strubelt, Charles E.: *See—*
Sullivan, Daniel S., 3rd; Strubelt, Charles E.; and Becker, Kenneth W., 4,028,268.

Strunz, Alfred; and Rohrer, Jurgen, to Dr. Th. Wieland, Firma. Photoelectric start-stop controls for gas burner. 4,028,047, Cl. 431-355.000.

Stucker, Donald D., to Gates Rubber Company, The. V-belt display hook. 4,027,799, Cl. 211-13.000.

Stuemky, Robert E., to Gates Rubber Company, The. Centering device for tubular flexible element couplings. 4,027,502, Cl. 64-8.000.

Sturbois, Gilbert: *See—*
Sureau, Claude; Tournaire, Michel; Zorn, Jean-Rene; Sturbois, Gilbert; Chavinie, Jacques; Le Houezec, Roger; and Ripoche, Andre, 4,027,657.

Sturhan, Klaus; and Lange, Gerd, to Gebr. Isringhausen. Indication of rotary spindle adjustment. 4,027,619, Cl. 116-124.00A.

Sturmer, David M., to Eastman Kodak Company. Photographic supports and elements utilizing photobleachable O-nitroarylidene dyes. 4,028,113, Cl. 96-84.00R.

Sturtevant, Alfred H.; and Trumbull, Robert L., to Varian Associates. Reproducible mounting of prealigned optical assemblies. 4,027,841, Cl. 248-19.000.

Sueyoshi, Tohru: *See—*
Sato, Akira; Ikeda, Tadashi; Sueyoshi, Tohru; Nakamura, Yasuharu; and Shimada, Takeo, 4,028,112.

Sugita, Jitsuo: *See—*
Yukinaga, Hisajiro; Sumimoto, Shinzaburo; Ishizuka, Ichiro; and Sugita, Jitsuo, 4,028,376.

Sugita, Tadashi: *See—*
Hashimoto, Makoto; Uehara, Shinzi; Sugita, Tadashi; and Shiina, Naonori, 4,028,448.

Sugiura, Akio: *See—*
Arai, Hiroshi; Nakamura, Akira; Sugiura, Akio; Okamoto, Atutoshi; and Toyama, Koichi, 4,027,926.

Sullivan, Daniel S., 3rd; Strubelt, Charles E.; and Becker, Kenneth W., to Exxon Research and Engineering Company. High temperature corrosion inhibitor. 4,028,268, Cl. 252-392.000.

Sumimoto, Shinzaburo: *See—*
Yukinaga, Hisajiro; Sumimoto, Shinzaburo; Ishizuka, Ichiro; and Sugita, Jitsuo, 4,028,376.

Sumitomo Chemical Company, Limited: *See—*
Futami, Takashi; Tatsukami, Yoshiharu; Takamoto, Toyoji; Oda, Yasuhiro; and Tomoda, Masayasu, 4,028,431.
Hotta, Seiji; Koga, Koichi; Bando, Tomoyuki; and Kondo, Yutaka, 4,028,331.
Tsuchiya, Hiroshi; Mukai, Kunio; Kimura, Akio; Taya, Hiroshi; Fujimoto, Keimei; Ozaki, Toshiaki; Yamamoto, Sigeo; Ogawa, Taizo; Ooishi, Tadashi; and Okuno, Yositosi, 4,028,438.
Wake, Shigeo; and Futagami, Mikio, 4,028,300.

Sumitomo Electric Industries, Ltd.: *See—*
Kawamoto, Kyoji; and Ishihara, Yosuke, 4,027,750.
Yamamoto, Masachika; and Taniuchi, Yasuhiko, 4,027,749.

Summers, John Gilbert; and Pierrepont, Maurice, to U.S. Philips Corporation. Semiconductor device manufacture. 4,028,140, Cl. 148-1.500.

Sun Chemical Corporation: *See—*
North, Bernard F.; and Lourigan, George H., 4,028,054.
Rosen, George; Carlick, Daniel J.; and Reiter, Ralph H., 4,028,204.

Sun Electric Corporation: *See—*
Trussell, Gerald C.; and Arnston, Robert W., 4,027,532.

Sun, Kwok K.: *See—*
Sayigh, Adnan A. R.; Sun, Kwok K.; and Ulrich, Henri, 4,028,361.

Sun Oil Company: *See—*
Brownstein, Arthur M.; and Kerr, David L., 4,028,423.

Sun Ventures, Inc.: *See—*
Driscoll, Gary L., 4,028,452.

Sundermann, Rudolf: *See—*
Rottloff, Gunther; Sundermann, Rudolf; Grigat, Ernst; and Putter, Rolf, 4,028,393.

Sundin, George Holger, to Conwed Corporation. Pad stacker. 4,027,580, Cl. 93-93.00M.

Sunkel Letelier, Carlos; and Cillero Grafulla, Fernando, to Alter S.A. Preparation of glycol (2-(p-chlorophenoxy)-2-methylpropionate)-2-nicotinate. 4,028,369, Cl. 260-295.50R.

Suntech, Inc.: *See—*
Borkowski, Walter L.; and Schneider, Abraham, 4,028,152.
Hansel, William B., 4,027,708.
Scheibel, Edward G., 4,028,079.
Schneider, Abraham, 4,028,153.

Supreme Farmstead Equipment, Inc.: *See—*
Weihmuller, Walter N., 4,027,806.

Sureau, Claude; Tournaire, Michel; Zorn, Jean-Rene; Sturbois, Gilbert; Chavinie, Jacques; Le Houezec, Roger; and Ripoche, Andre, to Agence Nationale de Valorisation de la Recherche (ANVAR). Foetal heart rate apparatus and method in which average foetal heart rate during non-deceleration periods is compared with the average foetal heart rate over a fewer number of periods. 4,027,657, Cl. 128-2.06F.

Sutton, James Anthony: *See—*
Walker, John Hirst; Sutton, James Anthony; and Waters, John Henry, 4,027,489.

Suyama, Toru: *See—*
Otsubo, Kizuku; Suyama, Toru; and Udagawa, Masanori, 4,027,633.

Suzaki, Kuniyoshi: *See—*
Shigeta, Yoshihiro; Suzaki, Kuniyoshi; and Ogiso, Mitsutoshi, 4,027,958.

Suzuki, Masao; and Moriya, Kunitoshi, to Fujitsu Ltd. Data transfer system. 4,028,666, Cl. 340-172.500.

Suzuki, Nobuo; Noguchi, Yasuhiro; and Masuda, Takao, to Fuji Photo Film Co., Ltd. Heat-developable photosensitive materials. 4,028,129, Cl. 96-114.100.

Swaim, Charles M. Container for air treating material. 4,028,073, Cl. 55-279.000.

Swaim, Gayland Clarence. Lockable rack for fishing rods and the like. 4,027,798, Cl. 211-4.000.

Swallow, Roger T.; and Pendergrass, John E., to Kendall Company, The. Therapeutic stocking. 4,027,667, Cl. 128-165.000.

Swanson, Erik. Manual thrust gauge. 4,027,535, Cl. 73-381.000.

Swatek, Rudolf W. Cartridge loading tray. 4,027,417, Cl. 42-87.000.

Sweeton, Gerard F., to Prince Manufacturing, Inc. Propulsion device for tennis balls and like spherical objects. 4,027,646, Cl. 124-56.000.

Swift and Company Limited: *See—*
Erickson, David R., 4,027,400.

Swilley, Wilson H., to Cincinnati Butchers' Supply Company, The. Stepping conveyor. 4,027,598, Cl. 104-162.000.

Sybron Corporation: *See—*
Ellis, Franklin H.; and Andrews, Stephen W., 4,027,393.
McGivern, Robert F., 4,028,249.
Meyer, Leonard S., 4,028,460.

Sze, Morgan C.; and Snell, George J., to Lummus Company, The. Liquefaction of sub-bituminous and lignitic coal. 4,028,221, Cl. 208-8.000.

Taccone, Ida, to Buskine S.A. Method for the preparation of derivatives of spiro (4,5)-decane and derivatives thus obtained. 4,028,351, Cl. 260-240.00K.

Tada, Masaaki: *See—*
Mizutani, Yoshiyuki; Tada, Masaaki; and Imada, Yasuo, 4,028,097.

Taiheiyo Engineering Incorporated: *See—*
Hujimori, Masao; Nakajima, Shigeo; Takahashi, Ken; Ito, Tsunetoshi; Shimada, Toshio; and Endo, Hajime, 4,027,918.

Takahashi, Hiroaki: *See—*
Moriyama, Akio; Fukai, Masakazu; Tatsuta, Hiroshi; Takahashi, Hiroaki; and Esaki, Hiroshi, 4,027,950.

Takahashi, Katsuhiko; and Doi, Hachiro, to Fuso Keigokin Co., Ltd. Lawn mower. 4,027,463, Cl. 56-13.600.

Takahashi, Ken: *See—*
Hujimori, Masao; Nakajima, Shigeo; Takahashi, Ken; Ito, Tsunetoshi; Shimada, Toshio; and Endo, Hajime, 4,027,918.

Takahashi, Toshio: *See—*
Tomishima, Hiroshi; Takahashi, Toshio; Ono, Kenichi; and Kumasaka, Kazuhiro, 4,028,144.

Takamoto, Toyoji: *See—*
Futami, Takashi; Tatsukami, Yoshiharu; Takamoto, Toyoji; Oda, Yasuhiro; and Tomoda, Masayasu, 4,028,431.

Takeda Chemical Ind., Ltd.: *See—*
Kamatani, Yoshio; Okazaki, Hisayoshi; Imai, Ko; Fujita, Noriaki; Yamazaki, Yoshio; and Ogino, Katsuhiko, 4,028,185.

Takei, Haruo: *See—*
Hinata, Masanao; Takei, Haruo; Sato, Akira; Iwamoto, Atsuo; and Hayashi, Jun, 4,028,115.

Takemoto, Katsumi: *See—*
Kawarai, Takashi; Sawada, Yuji; Takemoto, Katsumi; and Mikami, Sadao, 4,027,823.

Takeshita, Yasuhiro: *See—*
Seki, Kenji; Kimura, Akio; Asahi, Satoshi; and Takeshita, Yasuhiro, 4,028,435.

Takeuchi, Hiroshi; Ishizawa, Toshitugu; Yamano, Tetuyuki; Chiba, Ko; and Kobayashi, Daisaku, to Nissan Motor Co., Ltd.; and Riken Piston Ring Kogyo Kabushiki Kaisha. Oil seal assembly. 4,028,022, Cl. 418-104.000.

Takita, Hitoshi: *See—*
Enomoto, Satoru; Takita, Hitoshi; Wada, Hisayuki; Mukaida, Yutaka; and Yanaka, Mikiro, 4,028,387.

Talbert, Norwood K., to Agway, Inc. Method of prilling material. 4,028,447, Cl. 264-8.000.

Talento, Joseph L.: *See—*
Kurtz, Donald R.; Popadick, Carl C.; Sofianek, Joseph C.; and Talento, Joseph L., 4,028,514.

Talonen, Timo Tapani: *See—*
Aaltonen, Olavi August; Talonen, Timo Tapani; and Harkki, Seppo Untamo, 4,027,863.

Tambini, Angelo L.; and Wallace, Paul W., to Standard Pressed Steel Co. Simplified apparatus for and method of tightening fasteners. 4,027,530, Cl. 73-88.00F.

Tamura, Sadahiro: *See—*
Wakino, Kikuo; Nishikawa, Toshio; Tamura, Sadahiro; and Ishikawa, Youhei, 4,028,652.

Tanaka, Junzo; and Nakano, Chikao, to Matsushita Electric Industrial Co., Ltd. Microwave oven. 4,028,517, Cl. 219-10.55B.

Tanaka, Yasuzi: *See—*
Ueshima, Takashi; Tanaka, Yasuzi; and Kobayashi, Shoichi, 4,028,482.

Tandy Corporation: *See—*
Ringland, Robert S., 4,028,629.

Tanigami, Takahiko: *See—*
Hirashima, Kenzo; Tsujimura, Harutoshi; Hasegawa, Akira; Tanigami, Takahiko; and Ushiku, Kenichi, 4,028,516.

Tanikawa, Takayoshi, to Seibu Polymer Kasei Kabushiki Kaisha. Joint for culvert sections and the like. 4,027,902, Cl. 285-114.000.

Taniuchi, Yasuhiko: *See—*
Yamamoto, Masachika; and Taniuchi, Yasuhiko, 4,027,749.

Tanton, George A.; and Meyer, Harry C., to United States of America, Army. Low loss laser modulator. 4,027,948, Cl. 350-151.000.

Tasaka, Tomoyuki; and Honkawa, Yoshinori, to Ryobi, Ltd. Control mechanism for an offset printing machine. 4,027,588, Cl. 101-144.000.

Tasch, Al F., Jr.; and Frye, Robert C., to Texas Instruments Incorporated. Silicon gate ccd structure. 4,027,381, Cl. 29-578.000.

Tasch, Al F., Jr.; and Frye, Robert C., to Texas Instruments Incorporated. Silicon gate CCD structure. 4,027,382, Cl. 29-578.000.

Tashiro, Minoru; and Kimura, Shigeru, to Stanley Electric Co., Ltd. Voltage stabilizing device of a magneto alternating current generator. 4,028,611, Cl. 323-8.000.

Tasso, Joseph Nageeb. Information store system comprising a plurality of different shift-registers. 4,028,665, Cl. 340-172.500.

Tatsukami, Yoshiharu: *See—*
Futami, Takashi; Tatsukami, Yoshiharu; Takamoto, Toyoji; Oda, Yasuhiro; and Tomoda, Masayasu, 4,028,431.

Tatsumi, Hideo; and Ohuchi, Yasushi, to Hitachi, Ltd. AC Generator for vehicles. 4,028,568, Cl. 310-42.000.

Tatsuta, Hiroshi: *See—*
Moriyama, Akio; Fukai, Masakazu; Tatsuta, Hiroshi; Takahashi, Hiroaki; and Esaki, Hiroshi, 4,027,950.

Taya, Hiroshi: *See—*
Tsuchiya, Hiroshi; Mukai, Kunio; Kimura, Akio; Taya, Hiroshi; Fujimoto, Keimei; Ozaki, Toshiaki; Yamamoto, Sigeo; Ogawa, Taizo; Ooishi, Tadashi; and Okuno, Yositosi, 4,028,438.

Taylor, Fredrick J.; Smith, Jack; and Pries, Thomas H., to United States of America, Army. Crosswind measurements through pattern recognition techniques. 4,028,673, Cl. 340-146.30R.

Taylor, Gordon Joseph. Shaft bushes. 4,027,933, Cl. 308-238.000.

Taylor, Kenneth P.: *See—*
Needham, Donald G.; Taylor, Kenneth P.; and Brown, Claude V., 4,028,332.

Taylor, Leonard J. Optical device for providing a three dimensional view of a two dimensional image. 4,027,947, Cl. 350-144.000.

Teach, Eugene G., to Stauffer Chemical Company. Meta-bis anilide derivatives and their utility as herbicides. 4,028,093, Cl. 71-118.000.

Teass, Horace A., Jr. Circuit for monitoring the conductivity of a solution. 4,028,618, Cl. 324-30.00R.

Technicon Instruments Corporation: *See—*
Adler, Stanford L., 4,027,623.
Snyder, Lloyd R.; Oberhardt, Bruce J.; and Olich, Jack, 4,028,056.

Techno-Venture Co., Ltd.: *See—*
Matsubara, Sueo, 4,028,533.

Tefft, Franklin A.: *See—*
Barnum, Ronald E.; Tefft, Franklin A.; and Cotton, Louis S., 4,027,838.

Telebeam Corporation: *See—*
Ulicki, Edward M., 4,028,733.

Telpukhovsky, Evdokim Semenovich: *See—*
Pitelyaev, Grigory Vasilievich; Telpukhovsky, Evdokim Semenovich; Ravin, Boris Iosifovich; and Gladkov, Alexei Grigorievich, 4,027,441.

Tenconi, Riccardo. Pattern drum with pattern size increasing apparatus. 4,027,503, Cl. 66-50.00B.

Tenneco Inc.: *See—*
Offer, Robert J.; and Van Vooren, Bernard J., 4,028,243.

Tennessee Valley Authority: *See—*
Schultz, James J.; and Van Pelt, Vincent J., 4,028,087.

Tentarelli, Kenneth Donald, to Bell Telephone Laboratories, Incorporated. Feed-forward amplifier with simple resistive coupling. 4,028,634, Cl. 330-151.000.

Terman, Lewis Madison: *See—*
Heller, Lawrence Griffith; Terman, Lewis Madison; and Yee, Yen Sung, 4,028,558.

Terminal Data Corporation: *See—*
Frech, Roger Alvan; and Bondar, Martin Moses, 4,027,870.

Terrone, Andre, to Societe Anonyme des Equipements S.E.I.M. Rotor for an electrical machine. 4,028,573, Cl. 310-217.000.

Tessler, Arthur N.; Lupke, Gerd; Lupke, Manfred; and Tobias, Myron J. Method and device for removing concretions within human ducts. 4,027,674, Cl. 128-328.000.

Tetra Pak Developpement SA: *See—*
Rausing, Ruben; Nedstedt, Gert; Holmstrom, Hakan; Palm, Lars-Erik; and Stefan, Stjepan, 4,027,455.

Tewich, Johann: *See—*
Tuscher, Otto; Tewich, Johann; and Wittich, Willibald, deceased, 4,028,198.

Texaco Inc.: *See—*
Duranleau, Roger G.; and Larkin, John M., 4,028,388.
Kablaoui, Mahmoud S.; Reid, Robert E.; and Godfrey, Arthur W., 4,028,258.
Peelman, Harold E.; and Langford, Obie M., 4,028,546.
Pitts, Robert W., Jr., 4,028,660.
Smith, Randlow; Jones, Henry B.; Jobsis, Adrianus C.; and Deloney, Hugh C., 4,028,139.

Texas Instruments Incorporated: *See—*
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Cassidy, Stephen; Baboian, Robert; Frechette, Raymond A.; Haynes, Gardner S.; and Ross, John W., 4,028,064.
Emmons, Stephen P., 4,028,715.
Hartmann, Clinton S.; and Stigall, Robert E., 4,028,648.
Shortes, Samuel R.; and Millis, Edwin Graham, 4,027,686.
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Tasch, Al F., Jr.; and Frye, Robert C., 4,027,382.

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Th. Goldschmidt AG: *See—*
Fink, Hans-Ferdi; Fritsch, Herwig; Koerner, Gotz; Rossmy, Gerd; and Schmidt, Gunter, 4,028,218.

Thackery, Russell H. Tractor mounted log splitter. 4,027,709, Cl. 144-193.00R.

Thagard, George F., Jr. Apparatus and control system for heating asphalt. 4,028,527, Cl. 219-311.000.

Theobald, Reiner; and Heubner, Ulrich, to Metallgesellschaft Aktiengesellschaft; and Schweizerische Aluminium AG, part interest to each. Method for preparing a continuous casting belt. 4,027,716, Cl. 164-19.000.

Therm-O-Disc Incorporated: *See—*
Deubel, Bernard S., 4,027,385.

Theurer, Josef; and Riessberger, Klaus, to Franz Plasser Bahnbaumaschinen-Industrie-Gesellschaft m.b.H. Mobile track surveying apparatus. 4,027,397, Cl. 33-287.000.

Thoma, Jozef A.; and Stijfs, Petrus A. M. J., to Stamicarbon B. V. Process for the preparation of quinolines. 4,028,362, Cl. 260-283.0SY.

Thomas & Betts Corporation: *See—*
Bachle, Walter, 4,027,519.
Narozny, Ronald S., 4,027,941.

Thomas, Ian M., to Owens-Illinois, Inc. Method for manufacturing silicate glasses from alkoxides. 4,028,085, Cl. 65-134.000.

Thomas Industries, Inc.: *See—*
Hetzel, Thomas Robert, 4,028,015.

Thomasse, Andre: *See—*
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Thompson, Bernard J.: *See—*
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Thompson, David Allen: *See—*
Franaszek, Peter Anthony; and Thompson, David Allen, 4,028,535.

Thompson, Donald R., to Goodyear Tire & Rubber Company, The. Universal rocker. 4,027,843, Cl. 248-375.000.

Thompson, James L., to Dow Chemical Company, The. Composition and method for reducing the surface tension of aqueous fluids. 4,028,257, Cl. 252-8.55C.

Thompson, John A.; and Torres, Robert V., to Cutter Laboratories, Inc. Bag-making apparatus and process for making ported bags. 4,027,577, Cl. 93-35.0PC.

Thompson, Kenneth P., to Champion International Corporation. Apparatus and method for corona discharge priming a dielectric web. 4,028,551, Cl. 250-531.000.

Thompson, Martin C., to Reed International Limited. Float controlled valves. 4,027,693, Cl. 137-414.000.

Thomson-CSF: *See—*
Cachier, Gerard; and Puron, Jean Paul, 4,028,556.
Cord'homme, Edmond, 4,028,610.
Cottin, Jean; and Laxague, Jean, 4,028,531.
Jourdan, Francis; Couderc, Georges; and Ediar, Serge, 4,028,544.
Saint-Lot, Armand, 4,028,624.

Thorley, Graham R., to Transportation Design & Technology. Wheelchair lift. 4,027,807, Cl. 214-75.00R.

Throckmorton, Morford C., to Goodyear Tire & Rubber Company, The. Process of polymerization of conjugated diolefins using iron catalysts and sulfur ligands. 4,028,272, Cl. 252-429.00B.

Thurman, Merrell E. Freeze-up prevention device for a heat pump. 4,027,497, Cl. 62-156.000.

Tiersten, David: *See—*
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Timm, David G., to Timmco, Incorporated. Portable imprinter. 4,027,589, Cl. 101-269.000.

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Timmler, Helmut: *See—*
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Timour, Sune E., to Cummins Engine Company, Inc. Isolated engine cover. 4,027,644, Cl. 123-198.00E.

Tinker, Kenneth Dale. Wire come-along. 4,027,359, Cl. 24-115.00R.

Tire Recyclers International, Inc.: *See—*
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Tobbe, William P.: *See—*
Shufflebarger, Earl D.; Kish, Edward E.; Boylan, John R.; Diehl, George D.; Gallagher, Bernard J.; and Tobbe, William P., 4,028,254.

Tobias, Michael A.: *See—*
Brown, George L.; and Tobias, Michael A., 4,028,294.

Tobias, Myron J.: *See—*
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Tobin, Thomas J.: *See—*
Schmunk, E. William; and Tobin, Thomas J., 4,028,656.

Tochio, Yukihiro: *See—*
Sakai, Toshiyuki; Matsuo, Koichi; and Tochio, Yukihiro, 4,028,275.

Todd, Jackson D.; and Yarger, Francis C. Pipe reamer and capture tray. 4,027,681, Cl. 131-232.000.

Togo, Masaaki; Shima, Masao; and Mochizuki, Kiyoshi, to Yamatake-Honeywell Company Limited. Servo-motor control system. 4,028,604, Cl. 318-596.000.

Tohma Kohan Kabushiki Kaisha: *See—*
Tohma, Tsuyoshi, 4,027,715.

Tohma, Tsuyoshi, to Tohma Kohan Kabushiki Kaisha. Door. 4,027,715, Cl. 160-181.000.

Tokuda, Kazuo; Tsugita, Masanobu; and Minakuchi, Hiroshi, to Nippon Electric Company, Ltd.; and Matsushita Electric Industrial Co., Ltd. Control circuit of an electric motor comprising an output transistor of NPN type. 4,028,602, Cl. 318-345.00B.

Tokura, Naomi: *See—*
Masaki, Kenji; and Tokura, Naomi, 4,027,478.

Tokura, Yukio: *See—*
Mikasa, Yoshio; Nakane, Masami; and Tokura, Yukio, 4,027,965.

Tomishima, Hiroshi; Takahashi, Toshio; Ono, Kenichi; and Kumasaka, Kazuhiro, to Nippon Telegraph and Telephone Public Corporation. Semi-hard magnetic alloy with composite magnetic property and method of making the same. 4,028,144, Cl. 148-31.550.

Tomoda, Masayasu: *See—*
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Torres, Robert V.: *See—*
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Torrey, Sumner H., to Roper Corporation. Air flow system for common cavity microwave oven. 4,028,520, Cl. 219-10.55B.

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Tournaire, Michel: *See—*
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Towle, Allistair, to U.S. Philips Corporation. Stabilized crystal controlled oscillator. 4,028,638, Cl. 331-109.000.

Towne, Raymond A., to Westinghouse Electric Corporation. Ventilation system for dynamoelectric machines. 4,028,569, Cl. 310-64.000.

Townsend, Douglas W.; and Woods, H. Douglas, to Ontario Research Foundation. Recovery of mercury. 4,028,236, Cl. 210-45.000.

Toyama, Koichi: *See—*
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Toyo Boseki Kabushiki Kaisha: *See—*
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Transworld Adhesive & Chemical Corporation: *See—*
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Treat, Lyle G., to Dow Chemical Company, The. Lubricant-coolant emulsion additive for metal working operations. 4,027,512, Cl. 72-42.000.

Trefimetaux: *See—*
Moreau, Marc, 4,027,514.

Tressa, Frank J., to United States of America, Army. Automatic impedance matching using resistive and reactive diodes. 4,028,645, Cl. 333-17.00M.

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Trumbull, Robert L.: *See—*
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Trussell, Gerald C.; and Arnston, Robert W., to Sun Electric Corporation. Compression testing apparatus. 4,027,532, Cl. 73-117.200.

TRW Inc.: *See—*
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Tsai, Chen S., to United States of America, Navy. Acousto-optic guided-light beam device. 4,027,946, Cl. 350-96.0WG.

Tsang, Paul J.: *See—*
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Tsao, Utah, to Lummus Company, The. Aqueous stream treatment in chlorinated hydrocarbon production. 4,028,427, Cl. 260-659.00R.

Tschinkel, John; and Ballweg, Raymond A., to Potter Instrument Company, Inc. Pulley construction for high speed printer belt. 4,027,587, Cl. 101-111.000.

Tsuchiya, Hiroshi; Mukai, Kunio; Kimura, Akio; Taya, Hiroshi; Fujimoto, Keimei; Ozaki, Toshiaki; Yamamoto, Sigeo; Ogawa, Taizo; Ooishi, Tadashi; and Okuno, Yositosi, to Sumitomo Chemical Company, Limited. Phosphorothiolates. 4,028,438, Cl. 260-948.000.

Tsuchiya, Shozo; Sato, Hisatake; Oshima, Akio; and Hayashi, Hideo, to Nippon Oil Company Ltd. Process for the production of resins for printing ink. 4,028,291, Cl. 260-23.70C.

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Tsugita, Masanobu: *See—*
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Tsutomu, Abe; Yasuo, Hashino; and Hidehiko, Kobayashi, to Asahi Kasei Kogyo Kabushiki Kaisha. Method of obtaining urokinase. 4,028,187, Cl. 195-66.00B.

Tucholski, Gary Ronald, to Union Carbide Corporation. Safety switch for sealed galvanic cells. 4,028,478, Cl. 429-61.000.

Tucker, Huel C., to United States of America, Army. Automatic span circuit. 4,028,534, Cl. 235-151.350.
Tummarello, Natale J. Means for mounting concrete structural members. 4,027,711, Cl. 151-41.700.
Tup! (Panama) S.A.: *See*—
Tupper, Earl Silas, 4,027,778.
Tupper, Earl Silas, to Tup! (Panama) S.A. Container for foodstuffs or the like. 4,027,778, Cl. 220-354.000.
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Turner, Colin Francis Samuel, to GKN Transmissions Limited. Universal joints. 4,027,927, Cl. 308-72.000.
Turner, David; and Speer, Robert John, to National Research Development Corporation. Scanning monochromator and concave reflecting grating employed therein. 4,027,975, Cl. 356-100.000.
Turner, James E., to Tire Recyclers International, Inc. Moldable end products from primarily reclaimable waste materials. 4,028,288, Cl. 260-2.300.
Turzillo, Lee A. Composite earth drilling auger and method of installing same in situ. 4,027,491, Cl. 61-53.560.
Tuscher, Otto; Tewich, Johann; and Wittich, Willibald, deceased, to Messerschmitt-Bolkow-Blohm GmbH. Method of forming a reinforcing layer on the inner wall of the combustion and/or thrust nozzles for a liquid rocket engine. 4,028,198, Cl. 204-9.000.
Tuschner, Jerome G.; and Nickols, Richard C., Jr., to United Technologies Corporation. High temperature seal material and method for manufacturing the same. 4,028,324, Cl. 260-33.80F.
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Tyler, Hugh J.: *See*—
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Tymciurak, Bohdan, to Clark Equipment Company. Crane boom with angular side frame reinforcements. 4,027,448, Cl. 52-632.000.
Tynan, Daniel Gregory, to Du Pont de Nemours, E. I., and Company. Process for preparing concentrated acrylonitrile polymer solutions. 4,028,302, Cl. 260-32.60N.
Tyree, Bill D. Apparatus for ultrasonic inspection of ferromagnetic materials. 4,027,528, Cl. 73-67.80S.
Tyssee, Donald Armon, to Monsanto Company. Electrolytic monocarboxylation of activated olefins. 4,028,201, Cl. 204-72.000.
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Ulicki, Edward M., to Telebeam Corporation. Pictorial information retrieval system. 4,028,733, Cl. 360-10.000.
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Underwood, Robert L. Shampoo brush. 4,027,984, Cl. 401-28.000.
Unger, Henry Morton. Cleaning apparatus, particularly for cleaning window panes. 4,027,353, Cl. 15-245.000.
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National Aeronautics and Space Administration; administrator; with respect to an invention of:
Creel, Theodore R., Jr.; Jones, Robert A.; Corwin, Richard R.; and Kramer, Joseph S. Apparatus for determining thermophysical properties of test specimens. 4,027,524, Cl. 73-15.00R.
Smoot, George F.; Pope, William L.; and Smith, Lawrence. Low gravity phase separator. 4,027,494, Cl. 62-50.000.
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Usher, George William. Attachment device for a shower unit. 4,027,822, Cl. 239-305.000.

Ushiku, Kenichi: *See—*
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Utsugi, Kazuo, to Diesel Kiki Co., Ltd. Automobile air conditioner evaporator. 4,027,500, Cl. 62-519.000.

Uyeda, Frederick K.; and Austin, Buddy J., to Roper Corporation. Antenna construction for microwave oven. 4,028,521, Cl. 219-10.55F.

Vahlensieck, Hans-Joachim; Seiler, Claus-Dieter; and Kotzsch, Hans-Joachim, to Dynamit Nobel Aktiengesellschaft. Process for the preparation of organic silicon compounds. 4,028,384, Cl. 260-347.800.

Valkestijn, Leonardus Albertus Antonius: *See—*
Kantelberg, Adrianus Hubertus; and Valkestijn, Leonardus Albertus Antonius, 4,028,585.

Vance, Gilbert W.: *See—*
Mominee, David E.; and Vance, Gilbert W., 4,028,525.

Van Deberg, Walter H., to F. Jos. Lamb Company. Gravity conveyor system. 4,027,759, Cl. 193-1.000.

van den Berg, Antoon J., to Hollandsche Wegenbouw Zanen B.V.; and Olster Asphalt Fabriek B.V. Method for preparing materials containing minerals and synthetic substances, materials manufactured according to said method and objects consisting of said materials. 4,028,293, Cl. 260-28.5AS.

Vandenberg, John L.: *See—*
Rauchle, Roy J.; and Vandenberg, John L., 4,027,555.

van den Brink, Marinus J.; Austermuhle-Bertola, Helena; and Kramer, Petrus A., to Shell Oil Company. Process for the preparation of cyclobutanones. 4,028,418, Cl. 260-586.00C.

Van De Weghe, George W. Currency exchange calculator. 4,028,529, Cl. 235-89.00R.

Van Doorn, Donald W.; and Lloyd, Donald R., to Lummus Industries, Inc. Apparatus for sampling a stream of fibers and the like. 4,027,537, Cl. 73-421.00R.

vanManen, Dick T., to Voplex Corporation. Sealing plunger for cartridge. 4,027,810, Cl. 222-327.000.

van Oostveen, Arie A.; and Wittkampf, Fred H. M., to Vitatron Medical B.V. Pacing system with connector for connecting electrode to pacer. 4,027,678, Cl. 128-419.00P.

Van Pelt, Vincent J.: *See—*
Schultz, James J.; and Van Pelt, Vincent J., 4,028,087.

van Raalte, John A., to RCA Corporation. Electron multiplier image display device. 4,028,575, Cl. 313-105.00R.

Van Royen, Freddy Ghisleen, to AGFA-GEVAERT N.V. Free-radical photographic material. 4,028,108, Cl. 96-48.00R.

van Santen, Johannes Gerrit; and Collet, Marnix Guillaume, to U.S. Philips Corporation. Bulk channel charge-coupled device with blooming suppression. 4,028,716, Cl. 357-24.000.

Van Vooren, Bernard J.: *See—*
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Varah, James Shadrach: *See—*
Hart, John Michael; and Varah, James Shadrach, 4,027,362.

Varga, Leroy M.; and Fitch, Robert B., to Rockaway Corporation. Device for attaching box handles. 4,027,578, Cl. 93-36.700.

Varian Associates: *See—*
Sturtevant, Alfred H.; and Trumbull, Robert L., 4,027,841.

Vast Products Inc.: *See—*
Brown, William F., 4,028,289.

Vaudaux, Francis: *See—*
Frechin, Jean-Paul; and Vaudaux, Francis, 4,027,896.

Veatch, Franklin: *See—*
Sprague, James W.; Feldman, Daniel W.; and Veatch, Franklin, 4,028,065.

Veco Beheer Electroforming/Photo Etching B.V.: *See—*
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Vehlewald, Peter: *See—*
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Veloz, Jaime: *See—*
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Velsicol Chemical Corporation: *See—*
Anderson, Arnold L., 4,028,336.
Krenzer, John, 4,028,375.
Lindvay, Michael W., 4,028,333.

Veneklasen, Mark S. Musical horn construction. 4,027,571, Cl. 84-380.00R.

Venot, Robert: *See—*
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Verachtert, Thomas A.: *See—*
Carlson, David H. J.; Verachtert, Thomas A.; and Sobel, Jay E., 4,028,269.

Verbeij, Oswald Johannes, to U.S. Philips Corporation. Circuit arrangement in a television receiver, provided with a line deflection circuit and a switched supply voltage circuit. 4,028,589, Cl. 315-408.000.

Verdier, Henri, to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie. Tire filled with lubricant coated cellular particles. 4,027,712, Cl. 152-311.000.

Vereinigte Edelstahlwerke AG: *See—*
Plockinger, Erwin; Daghofer, Otto; and Barakat, Farouk, 4,027,720.

Verhoeven, Gerardus H. Th. M.; and Stensen, Heinrich P., to Smit Ovens Nijmegen B.V. Tunnel furnace for the heat treatment of articles. 4,028,052, Cl. 432-145.000.

Vidard, Michel: *See—*
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Vig, John R.; and LeBus, John W., to United States of America, Army. Method of cleaning surfaces by irradiation with ultraviolet light. 4,028,135, Cl. 134-1.000.

Vig, John R.: *See—*
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Vinyl-Chem International, Inc.: *See—*
Golumbic, Harvey J., 4,028,160.

Viohl, Uwe, to International Standard Electric Corporation. Photochemical system for coating the luminescent screen of a color television picture tube. 4,028,114, Cl. 96-93.000.

Vishnitsky, Igor Konstantinovich: *See—*
Shemonaev, Alexandr Tikhonovich; Cherny, Dmitry Grigorievich; Genis, Semen Naumovich; and Vishnitsky, Igor Konstantinovich, 4,027,438.

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Vittorelli, Vittore, to Ing. C. Olivetti & C., S.p.A. System for automatically processing and printing the contents and the format of a text. 4,028,680, Cl. 340-172.500.

Vittorelli, Vittore, to Ing. C. Olivetti & C., S.p.A. System for automatically processing and printing the contents and the format of a text. 4,028,681, Cl. 340-172.500.

Vlahakis, Peter J. Apparatus for alignment of plaid fabric on a cutting table. 4,027,395, Cl. 33-80.000.

Voegeli, Otto: *See—*
Eggenberger, John Scott; and Voegeli, Otto, 4,028,685.

Volesky, Bohumil: *See—*
Zajic, James E.; and Volesky, Bohumil, 4,028,182.

Volk, Joseph A., Jr., to Beta Corporation. Image counter. 4,028,552, Cl. 250-570.000.

Volkmann, Adolf. Skateboard with brake. 4,027,890, Cl. 280-11.200.

Volkswagenwerk Aktiengesellschaft: *See—*
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Voplex Corporation: *See—*
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Vygen, Peter: *See—*
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W. C. Heraeus GmbH: *See—*
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W. Schlafhorst & Co.: *See—*
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Wack, Andre; Bezicot, Robert; and Cosset, Andre. Fluid jack with built-in piston operated switch. 4,028,511, Cl. 200-82.00R.

Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH: *See—*
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Wada, Hisashi: *See—*
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Wada, Hisayuki: *See—*
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Wada, Masahiro; and Date, Masakazu, to Toyo Boseki Kabushiki Kaisha. Polyester fiber treated with anionic polyalkylene oxide emulsified polyester polyether finish. 4,027,346, Cl. 8-30.000.

Wagner, Kuno; and Hajek, Manfred, to Bayer Aktiengesellschaft. Urea

or carbonamide containing diisocyanate polyaddition products with phosphoric ester substituents. 4,028,306, Cl. 260-75.0NT.
Wagner, Kuno: *See—*
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Schafer, Walter; Wagner, Kuno; and Muller, Hans-Jurgen, 4,028,310.
Wagner, Richard C.; and Banike, Ronald A., to Hollymatic Corporation. Meat tenderizer. 4,027,356, Cl. 17-25.000.
Wagner, Walter. Scouring pad with retained contoured stiffener. 4,027,352, Cl. 15-209.00C.
Wagner, William. Air injection engine. 4,027,632, Cl. 123-75.0RC.
Wahl, Edward F., III, to Occidental Petroleum Corporation. Device for converting internal energy of hot fluids to shaft work. 4,027,483, Cl. 60-641.000.
Wahl, Richard: *See—*
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Wahlborg, Harold J.: *See—*
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Wake, Shigeo; and Futagami, Mikio, to Sumitomo Chemical Company, Limited. Coating composition. 4,028,300, Cl. 260-31.20R.
Wakino, Kikuo; Nishikawa, Toshio; Tamura, Sadahiro; and Ishikawa, Youhei, to Murata Manufacturing Co., Ltd. Dielectric resonator and microwave filter using the same. 4,028,652, Cl. 333-73.00W.
Walcon Corporation: *See—*
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Walden, Jack M.: *See—*
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Walker, Brooks. Wheeled suitcase. 4,027,754, Cl. 190-18.00A.
Walker, Francis H.: *See—*
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Walker, John Hirst; Sutton, James Anthony; and Waters, John Henry, to Dowty Mining Equipment Limited. Mine roof support. 4,027,489, Cl. 61-45.00D.
Wallace, Paul W.: *See—*
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Wallace, Ray H., to Transworld Adhesive & Chemical Corporation. Method for making hot melt adhesive sticks and other shapes. 4,028,458, Cl. 264-148.000.
Wallding, Wayne A.; and Arrandale, Roy S., to Dart Industries Inc. Pre-labelled coated container. 4,027,426, Cl. 40-310.000.
Wallis, James William, to Wallis Separators Limited. Separator method and apparatus. 4,028,232, Cl. 210-19.000.
Wallis, Marvin E. Modular engine assembly. 4,027,484, Cl. 60-709.000.
Wallis, Marvin E. Modular engine assembly. 4,027,485, Cl. 60-709.000.
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Wallrafen, Gunter, to Maschinen- und Bohrgerate-Fabrik Alfred Wirth & Co., K.G. Device for actuating screw-threaded bolts. 4,027,559, Cl. 81-57.380.
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Waltrip, Owen R., to Nuclear Supreme. Material mixing and compacting apparatus. 4,028,040, Cl. 425-449.000.
Ward, Dennis J.: *See—*
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Ward, Donald H.; and Buffenbarger, John K., to Armco Steel Corporation. Seam forming apparatus. 4,027,611, Cl. 113-54.00R.
Wardlaw, Stephen Clark; Levine, Robert Aaron; and Massey, James Vincent, III. Material layer volume determination. 4,027,660, Cl. 128-2.00F.
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Watanabe, Atsumi, to Hitachi, Ltd. Inverter control system. 4,028,607, Cl. 321-5.000.
Watanabe, Eiki, to Mitsubishi Denki Kabushiki Kaisha. Elevator speed control system. 4,027,745, Cl. 187-29.00R.
Watanabe, Katsumi, to Yugen Kaisha Watanabe Kenkyusho. Toy phonograph with automatic pickup arm return means. 4,027,887, Cl. 274-1.00A.
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Watkins, Laurence Shrapnell: *See—*
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Watson, Kenneth, to Westland Aircraft Limited. Rotor for rotary wing aircraft. 4,028,001, Cl. 416-134.00A.
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Weavell, Jack, to CAE Machinery Ltd. Controlled transversely movable guide means for lumber. 4,027,563, Cl. 83-106.000.
Webb, Jimmy L., to General Electric Company. Novel flame retardant polycarbonate compositions. 4,028,297, Cl. 260-37.0PC.
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Weber, Gerald; and Sorgenfrei, Jurgen, to Olympia Werke AG. Circuit arrangement for selecting the function of connection contacts on circuit chips. 4,028,682, Cl. 340-172.500.
Weber, Harold J., to Coulter Information Systems, Inc. Corona power supply circuit. 4,028,596, Cl. 361-235.000.
Webster, William C.; Hilton, Robert G.; and Cotts, Ronald F., to IU Conversion Systems, Inc. Disposal method and use of sewage sludge. 4,028,130, Cl. 106-120.000.
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Weiland, Emil; Schwarz, Alois; and Frommlet, Hubert, to Messerschmitt-Bolkow-Blohm GmbH. Blade connection for helicopter rotor blades. 4,028,000, Cl. 416-107.000.
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White, George Raymond, to Smith Kline & French Laboratories Limited. Process for preparing 2-amino-2-alkylthio-1-nitroethylene compounds. 4,028,379, Cl. 260-309.000.
White, Harry Gregory: *See—*
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White, Jack D., Jr., to Dayco Corporation. Endless power transmission belt and method of making same. 4,027,545, Cl. 74-233.000.
White, Kenneth N. Router for trimming laminate plastics. 4,027,575, Cl. 90-12.00D.

White, Thomas William. Electrical connector. 4,027,939, Cl. 339-247.000.
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Wilcox, Thomas J. Variable contour seating device. 4,027,888, Cl. 297-284.000.
Wildhaber, Ernest. Positive-displacement unit with coaxial rotors. 4,028,019, Cl. 418-36.000.
Wilhelm, Frederick C., to UOP Inc. Hydrocarbon conversion with a sulfided acidic multimetallic catalytic composite. 4,028,225, Cl. 208-139.000.
Willard, Robert. Floor support for sectionalized buildings. 4,027,439, Cl. 52-79.100.
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Wilson, Dennis Robert, to Bell Telephone Laboratories, Incorporated. Dynamic sense-refresh detector amplifier. 4,028,557, Cl. 307-362.000.
Wilson, Donald C., to FMC Corporation. Air-free pouch packaging method. 4,027,456, Cl. 53-22.00B.
Wilson, Edward: *See—*
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Wofsey, David. Sonic spark plug. 4,028,576, Cl. 313-143.000.
Wolfe, Denis G., to Robertshaw Controls Company. Explosion resistant electric heat motor gas valve. 4,027,689, Cl. 137-68.00R.
Wolfe, Merritt W., to Goodyear Tire & Rubber Company, The. Kettle used in the retreading or repair of tires. 4,028,168, Cl. 156-394.000.
Wolfe, Robert W., to Clark Equipment Company. Transmission with shift blocker clutch mechanisms. 4,027,756, Cl. 192-53.00E.
Wolfer, Gerhard, to Siemens-Albis Aktiengesellschaft. Control of peripheral apparatus in telecommunication. 4,028,676, Cl. 340-147.0SC.
Wolff, Otto E., to Polaroid Corporation. Method and apparatus for compressing vaporous or gaseous fluids isothermally. 4,027,993, Cl. 415-1.000.
Wollard, Donald L. Planing boat hull. 4,027,613, Cl. 114-291.000.
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Woodward, John William, to United States of America, Navy. SNAIAS digital data test set. 4,028,536, Cl. 235-153.00A.
Woolworth, Harrison R. Scrap metal preheating apparatus and method. 4,028,048, Cl. 432-5.000.
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Yaguinuma, Jusuke, to Copal Company Limited. Dating mechanism for calendar clocks. 4,027,469, Cl. 58-6.00R.
Yaguinuma, Jusuke, to Copal Company Limited. Ratchet claw. 4,027,550, Cl. 74-577.00S.
Yahara, Satoshi, to Kabushiki Kaisha Token Kikai Seisakusho. Machine for cutting a moving strip of material. 4,027,564, Cl. 83-328.000.
Yamada, Koichi; Morimoto, Teijiro; and Yoshioka, Yoshioki, to Mitsui Petrochemical Industries, Ltd. Process for preparing resins for use in printing ink. 4,028,119, Cl. 106-32.000.
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Yamamoto, Masachika; and Taniuchi, Yasuhiko, to Sumitomo Electric Industries, Ltd. Latch spring assembly for disc brake pad guide pins. 4,027,749, Cl. 188-73.300.
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Tsuchiya, Hiroshi; Mukai, Kunio; Kimura, Akio; Taya, Hiroshi; Fujimoto, Keimei; Ozaki, Toshiaki; Yamamoto, Sigeo; Ogawa, Taizo; Ooishi, Tadashi; and Okuno, Yositosi, 4,028,438.
Yamamoto, Tadahiro; and Yoneda, Kenji, to Nissan Motor Co., Ltd. Flow rate control apparatus in exhaust gas recirculation system. 4,027,636, Cl. 123-119.00A.
Yamamoto, Takenori; Tsukisaka, Tsuneo; and Tsukahara, Takeshi, to Honda Giken Kogyo Kabushiki Kaisha. Fitting device for windshield. 4,027,914, Cl. 296-78.100.
Yamamoto, Tomio; Sakasegawa, Koji; Osumi, Atsushi; Hosaka, Yukio; and Yamada, Takeo, to Nippon Kokan Kabushiki Kaisha; and Fuji Toyuki Kabushiki Kaisha. Method and apparatus for non-contact measurement of a gauge of a high temperature material. 4,027,978, Cl. 356-156.000.
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Young, Raymond Donald. Passing vehicle signalling apparatus. 4,028,662, Cl. 340-32.000.

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Zankl, Frank; Kirkham, Edward E.; Stobbe, Richard E.; and Schachte, John J., to Kearney & Trecker Corporation. Method of controlling an A.C. motor. 4,028,599, Cl. 318-227.000.

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Zuest, Harry, to Contraves AG. Liquid for a feeler element for the electrical measurement of inclinations. 4,028,260, Cl. 252-62.200.

Zuleeg, Rainer, to McDonnell Douglas Corporation. Negative impedance transistor device. 4,028,562, Cl. 307-303.000.

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Zurcher, Rudolf F., to Hughes Aircraft Company. Simplified tabulator keyboard assembly for use in watch/calculator having transparent foldable flexible printed circuit board with contacts and actuator indicia. 4,028,509, Cl. 200-5.00A.

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LIST OF DEFENSIVE PUBLICATIONS

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Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Arter, Nelson Kay; Eichhorn, Thomas Franklin; and Jackson, Howard Carl. Dynamic deskewing for a rotating head recording device. T959,012, 6-7-77, Cl. 360-76.000.

Blount, William W., Jr.: *See*—
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Chandra, Bala Perampalam, to Imperial Chemical Industries Limited. Method of treating polymer latices. T959,008, 6-7-77, Cl. 528-500.000.

Clark, Robert Ellis. Spinneret. T959,002, 6-7-77, Cl. 75-126.00C.

Dilks, Charles Heritage, Jr.: *See*—
Kirkland, Joseph Jack; and Dilks, Charles Heritage, Jr., T959,004.

Du Pont de Nemours, E. I., and Company: *See*—
Kirkland, Joseph Jack; and Dilks, Charles Heritage, Jr., T959,004.

Eichhorn, Thomas Franklin: *See*—
Arter, Nelson Kay; Eichhorn, Thomas Franklin; and Jackson, Howard Carl, T959,012.

Froot, Howard A.; and Singh, Vijendra P. Method of determining yield loss due to a combination of defects in manufacturing method utilizing same. T959,005, 6-7-77, Cl. 235-151.130.

Hansen, David R. Printing ink resin composition. T959,010, 6-7-77, Cl. 260-829.000.

Hull, Joan Helen. Electrostatic process development apparatus. T959,003, 6-7-77, Cl. 118-658.000.

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Jackson, Howard Carl: *See*—
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Jones, Thomas M., to Tennessee Valley Authority. Production of suspension fertilizers from wet-process orthophosphoric acids. T959,001, 6-7-77, Cl. 71-34.000.

Kirkland, Joseph Jack; and Dilks, Charles Heritage, Jr., to Du Pont de Nemours, E. I., and Company. Chromatographic liquid dispensing inlet and method. T959,004, 6-7-77, Cl. 210-31.00C.

McConnell, Richard Leon; and Weemes, Doyle Allen. Process for powdering semi-crystalline polyester pellets. T959,009, 6-7-77, Cl. 260-75.00T.

Sanders, Robert R. Coating compositions. T959,007, 6-7-77, Cl. 260-16.000.

Singh, Vijendra P.: *See*—
Froot, Howard A.; and Singh, Vijendra P., T959,005.

Smith, Robert Clarence. Transparent high-impact polystyrene resins and their manufacture. T959,011, 6-7-77, Cl. 260-876.00B.

Sugga, James L.; and Blount, William W., Jr. Curing system for unsaturated materials. T959,006, 6-7-77, Cl. 526-14.000.

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LIST OF REISSUE PATENTEES

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Aktiebolaget Electrolux: *See*—
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AMP Incorporated: *See*—
Fritz, William Baird, Re. 29,258.

Appenzeller, Valentin; and Kutz, Johannes, to Eduard Kuesters Maschinenfabrik. Means for continuous dyeing of pile warp textiles especially of carpets. Re. 29,251, Cl. 68-22.00R.

Bryson, James D.: *See*—
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Congleton, Wayne, to Dolco Packaging Corporation. Container. Re. 29,248, Cl. 47-77.000.

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Dolco Packaging Corporation: *See*—
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Eduard Kuesters Maschinenfabrik: *See*—
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Fritz, William Baird, to AMP Incorporated. Coated ferrite RF filters. Re. 29,258, Cl. 333-70.00S.

Huyen, Vu-Ngoc: *See*—
Joullie, Maurice L.; Maillard, Gabriel; Lakah, Lucien; Muller, Pierre; and Huyen, Vu-Ngoc, Re. 29,256.

Joullie, Maurice L.; Maillard, Gabriel; Lakah, Lucien; Muller, Pierre; and Huyen, Vu-Ngoc, to Recherche Pharmaceutiques et Scientifiques. Digestive pharmaceutical composition comprising S-carboxymethyl cysteine for reducing viscosity of respiratory tract secretions, and method of treating therewith. Re. 29,256, Cl. 424-311.000.

Kabushiki Kaisha Suwa Seikosha: *See*—
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Kahle, Rolf D.; Studley, David K.; and Bryson, James D., to Quantor Corporation. Microfiche recorder and processor. Re. 29,254, Cl. 355-28.000.

Kilstrom, Lars Gunnar; and Ridderstrom, Goran Arvid Henning, to Aktiebolaget Electrolux. Surface treating attachment device. Re. 29,247, Cl. 15-380.000.

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Sabsay, Daniel M. Self re-keying security device. Re. 29,259, Cl. 340-149.00A.
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153 4,028,161
158 4,028,162
173 4,028,164
229 4,028,163
234 4,028,165
382 4,028,166
384 4,028,167
394 4,028,168
416 4,028,169
513 4,028,170
643 4,028,155

CLASS 160

84 R 4,027,714
181 4,027,715

CLASS 162

19 4,028,171
164 R 4,028,172
181 A 4,028,173
264 4,028,174
274 4,028,175

CLASS 164

19 4,027,716
44 4,027,717
46 4,027,718
51 4,027,719
52 4,027,720
64 4,027,722
213 4,027,723
260 4,027,724
278 4,027,725
305 4,027,726

CLASS 165

9 4,027,721
48 4,027,727
105 4,027,728
111 4,027,729

CLASS 166

156 4,027,730
267 4,027,731
312 4,027,732

CLASS 171

58 4,027,733

CLASS 174

78 4,028,487
128 S 4,028,488
166 R 4,028,489

CLASS 175

9 4,027,734

CLASS 176

38 4,028,176
4,028,177
4,028,178
4,028,179
78 4,028,180
82 4,028,181

CLASS 177

118 4,027,735
147 4,027,736

CLASS 178

88 4,028,490

CLASS 179

1 AL 4,028,492
1 SW 4,028,491
2 DP 4,028,493
6.3 R 4,028,494
15 AS 4,028,496
15 AT 4,028,495
15 BS 4,028,497
18 BD 4,028,499
18 GE 4,028,498
41 A 4,028,500
84 VF 4,028,501
99 4,028,502
115 R 4,028,503
146 R 4,028,504
170 G 4,028,505
170.2 4,028,506
175.3 R 4,028,507
189 D 4,028,508

CLASS 180

11 4,027,737
14 A 4,027,738
89.1 4,027,739

CLASS 181

68 4,027,740

CLASS 182

22 4,027,741
92 4,027,742

CLASS 184

6.4 4,027,743
7 F 4,027,744

CLASS 187

29 R 4,027,745

CLASS 188

24 4,027,746
28 4,027,747
65.4 4,027,748
73.3 4,027,749
4,027,750
73.5 4,027,751
73.6 4,027,752
181 R 4,027,753

CLASS 190

18 A 4,027,754

CLASS 192

4,027,755
53 E 4,027,756
106.2 4,027,757
113 B 4,027,758

CLASS 193

1 4,027,759
2 R 4,027,760

CLASS 195

28 N 4,028,183
4,028,184
28 R 4,028,182
30 4,028,185
31 R 4,028,186
66 B 4,028,187
96 4,028,188
109 4,028,189
127 4,028,190

CLASS 197

1 R 4,027,761
4,027,762
16 4,027,763
49 4,027,764
133 R 4,027,765
151 4,027,766

CLASS 198

339 4,027,767
370 4,027,768
570 4,027,769
618 4,027,792
719 4,027,793
728 4,027,770

CLASS 200

5 A 4,028,509
61.45 M 4,028,516
61.45 R 4,028,510
82 R 4,028,511
84 C 4,028,512
144 B 4,028,514
144 R 4,028,513
276 4,028,515

CLASS 202

158 4,028,191
227 4,028,192
248 4,028,193

CLASS 203

2 4,028,194
38 4,028,195

CLASS 204

1 T 4,028,196
4,028,197
9 4,028,198
10 4,028,199
43 T 4,028,200
72 4,028,201
106 4,028,202
158 R 4,028,203
159.14 4,028,204
181 4,028,205
192 C 4,028,206
195 R 4,028,207
252 4,028,208
4,028,209
266 4,028,210
267 4,028,211
272 4,028,212
286 4,028,213
4,028,214
290 F 4,028,215

CLASS 206

395 4,027,794
409 4,027,795
507 4,027,796

CLASS 208

8 4,028,219
4,028,220
4,028,221
11 R 4,028,222
91 4,028,223
92 4,028,224
139 4,028,225
180 4,028,226
216 4,028,227

CLASS 209

39 4,028,228
74 R 4,027,797
164 4,028,229
403 4,028,230
457 4,028,231

CLASS 210

19 4,028,232
28 4,028,233
37 R 4,028,234
44 4,028,235
45 4,028,236
4,028,237
53 4,028,238
58 4,028,239
59 4,028,240
60 4,028,241
71 4,028,242
130 4,028,243
150 4,028,244
151 4,028,245
4,028,246
153 4,028,247
232 4,028,248
242 R 4,028,249
259 4,028,250
280 4,028,251
321 B 4,028,252
4,028,253
447 4,028,254
500 R 4,028,255
519 4,028,256

CLASS 211

4 4,027,798
13 4,027,799

CLASS 212

14 4,027,800
145 4,027,801

CLASS 214

1 BV 4,027,804
1 H 4,027,803
1 SW 4,027,802
6 G 4,027,805
16 R 4,027,806
38 CA 4,027,823
75 R 4,027,807
313 4,027,808
353 4,027,809
621 4,027,771
762 4,027,772
766 4,027,773

CLASS 219

10.55 B 4,028,517
4,028,519
4,028,520
10.55 F 4,028,521
10.81 4,028,518
109 4,028,522
121 EM 4,028,523
121 L 4,028,524
4,028,525
295 4,028,526
311 4,028,527

CLASS 220

23.83 4,027,779
63 R 4,027,774
266 4,027,775
281 4,027,776
295 4,027,777
354 4,027,778

CLASS 221

7 4,027,780
105 4,027,781

CLASS 222

1 4,027,782
26 4,027,783
102 4,027,784
135 4,027,785
146 HA 4,027,786
166 4,027,787
190 4,027,789
285 4,027,790
327 4,027,810
396 4,027,791
529 4,027,811
614 4,027,788

CLASS 223

96 4,027,812

CLASS 225

97 4,027,813
104 4,027,814

CLASS 226

194 4,027,815

CLASS 229

14 C 4,027,817
37 R 4,027,818
65 4,027,819

CLASS 233

20 A 4,027,820

CLASS 235

61.11 E 4,028,528
61.9 R 4,028,537
89 R 4,028,529
144 HC 4,028,530
151 4,028,533
151.1 4,028,532
151.35 4,028,534
152 Re.29,257
4,028,535
153 A 4,028,536
153 AM 4,028,539
156 4,028,538

CLASS 236

150.2 4,028,531

CLASS 237

1 A 4,027,821

CLASS 239

305 4,027,822

CLASS 240

6.46 4,028,540
25 4,028,541
41.36 4,028,542
52.1 4,028,543

CLASS 241

152 A 4,027,824
213 4,027,825
221 4,027,826

CLASS 242

7.05 B 4,027,827
56.6 4,027,828
107.4 A 4,027,829
118.32 4,027,830
125.1 4,027,831
197 4,027,832

CLASS 243

31 4,027,833

CLASS 244

3.11 4,027,834
3.16 4,027,837
17.11 4,027,838
101 4,027,835
103 R 4,027,836
195 4,027,839

CLASS 246

122 R 4,027,840

CLASS 248

19 4,027,841
75 4,027,842
375 4,027,843

CLASS 249

111 4,027,844
142 4,027,845
189 4,027,846
190 4,027,847

CLASS 250

203 R 4,028,544
252 4,028,545
266 4,028,546
272 4,028,547
330 4,028,548
336 4,028,549
359 4,028,267
445 T 4,028,554
483 4,028,550
531 4,028,551
570 4,028,552
576 4,028,553

CLASS 251

11 4,027,848
30 4,027,849
141 4,027,850
172 4,027,851
228 Re.29,253
333 4,027,852
361 4,027,853

CLASS 252

8.55 C 4,028,257
46.7 4,028,258
4,028,259
62.2 4,028,260
89 R 4,028,261
4,028,262
99 4,028,263
182 4,028,264
301.1 W 4,028,265
313 R 4,028,216
4,028,266
321 4,028,218
392 4,028,268
428 4,028,269
4,028,270
429 B 4,028,272
429 R 4,028,271
432 4,028,273
447 4,028,274
466 PT 4,028,275
513 4,028,276
519 4,028,277
522 4,028,278
4,028,279
526 4,028,280
527 4,028,281
537 4,028,282
551 4,028,283

CLASS 254

29 R 4,027,854

CLASS 256

21 4,027,855
47 4,027,856

CLASS 259

4 AB 4,027,857
4 R 4,027,858
18 4,027,859
149 4,027,860

CLASS 260

2.2 C 4,028,284
2.3 4,028,288
2.5 FP 4,028,285
2.5 N 4,028,287
4,028,289
2.5 P 4,028,286
17.4 GC 4,028,290
23.7 C 4,028,291
27 R 4,028,292
28.5 AS 4,028,293
29.1 SB 4,028,298
29.3 4,028,367
29.6 H 4,028,295
29.6 NR 4,028,294
30.4 N 4,028,296
4,028,299
31.2 R 4,028,300
31.4 R 4,028,301
32.6 N 4,028,302
33.2 R 4,028,303
33.8 F 4,028,324
33.8 UB 4,028,304
37 PC 4,028,297
42.15 4,028,325
42.22 4,028,326
4,028,327
42.44 4,028,328
42.53 4,028,329
45.7 P 4,028,330
45.75 B 4,028,335
45.75 R 4,028,336
45.75 S 4,028,337
45.8 N 4,028,334
45.8 NT 4,028,331
4,028,333
45.8 R 4,028,332
46.5 R 4,028,338
4,028,339
47 ET 4,028,341
47 UA 4,028,340
4,028,342
59 R 4,028,343
75 H 4,028,308
75 NT 4,028,306
75 R 4,028,307
75 S 4,028,305
77.5 AN 4,028,309
77.5 AP 4,028,313
77.5 AQ 4,028,312
77.5 CH 4,028,310
77.5 R 4,028,311
78 A 4,028,315
78 L 4,028,314
79.5 P 4,028,316
112 R 4,028,317
112.5 R 4,028,318
4,028,319
117 4,028,320
146 R 4,028,321
154 4,028,322
157 4,028,323
174 4,028,344
192 4,028,345
239 R 4,028,346
239.3 A 4,028,347
239.5 4,028,348
239.55 D 4,028,349
240 K 4,028,351
240 R 4,028,350
4,028,352
240.6 4,028,353
243 C 4,028,354
4,028,355
248 AS 4,028,356
249.5 4,028,357
254 4,028,358
256.4 R 4,028,359

256.5 R 4,028,360
283 SY 4,028,362
286 R 4,028,363
293.54 4,028,364
293.61 4,028,365
293.62 4,028,366
295 R 4,028,368
295.5 R 4,028,369
296 H 4,028,370
297 R 4,028,371
299 4,028,372
301 4,028,373
305 4,028,374
306.8 D 4,028,375
307 G 4,028,377
307 H 4,028,376
309 4,028,379
309.5 4,028,378
309.6 4,028,380
310 R 4,028,381
314 4,028,217
315 4,028,382
326.29 4,028,383
347.8 4,028,384
410 4,028,385
410.9 N 4,028,387
410.9 R 4,028,386
413 4,028,388
429 CY 4,028,389
429.3 4,028,390
448.2 D 4,028,391
453 AR 4,028,392
453 P 4,028,393
455 A 4,028,394
465.4 4,028,395
468 D 4,028,396
468 G 4,028,397
471 A 4,028,398
479 C 4,028,399
488 B 4,028,400
500.5 H 4,028,401
501.14 4,028,402
502.5 4,028,403
515 R 4,028,404
534 C 4,028,405
534 S 4,028,406
536 4,028,407
539 R 4,028,408
551 S 4,028,409
553 R 4,028,410
558 R 4,028,411
566 A 4,028,412
566 AC 4,028,413
566 R 4,028,414
570 D 4,028,361
570 R 4,028,415
570.5 P 4,028,416
586 C 4,028,417
4,028,418
586 R 4,028,419
601 R 4,028,420
606.5 P 4,028,421
607 AR 4,028,422
610 B 4,028,423
638 R 4,028,424
645 4,028,425
652 P 4,028,426
659 R 4,028,427
674 SA 4,028,428
680 R 4,028,429
683.43 4,028,430
827 4,028,431
836 4,028,432
873 4,028,433
874 4,028,434
878 B 4,028,435
878 R 4,028,436
880 R 4,028,437
948 4,028,438
973 4,028,439

CLASS 261

23 R 4,028,440
36 R 4,028,441
94 4,028,442
114 TC 4,028,443
122 4,028,444
142 4,028,445

CLASS 264

8 4,028,447
.5 4,028,446
37 4,028,448
45.3 4,028,449
45.5 4,028,450
45.8 4,028,451
51 4,028,452
67 4,028,453
82 4,028,454
89 4,028,455
90 4,028,456
120 4,028,457
148 4,028,458
159 4,028,459
263 4,028,460
297 4,028,461

CLASS 266

149 4,027,861
160 4,027,862
162 4,027,863
170 4,027,864

CLASS 267

148 4,027,865

CLASS 269

41 4,027,866
94 4,027,867
266 4,027,868
328 4,027,869

CLASS 271

65 4,027,870
95 4,027,871
170 4,027,872
197 4,027,873

CLASS 272

1 R 4,027,874
76 4,027,875
133 4,027,876

CLASS 273

1 R 4,027,877
6 4,027,878
14 4,027,883
29 A 4,027,879
4,027,880
73 R 4,027,881
134 AT 4,027,882
148 R 4,027,884
169 4,027,885
186 A 4,027,886

CLASS 274

1 A 4,027,887

CLASS 277

188 R 4,027,816

CLASS 280

5.22 4,027,889
7.14 4,027,891
11.2 4,027,890
179 R 4,027,892
487 4,027,893
502 4,027,894
604 4,027,895
618 4,027,896
631 4,027,897
720 4,027,898
722 4,027,899
745 4,027,900
746 4,027,905
751 4,027,906

CLASS 285

55 4,027,901
114 4,027,902
156 4,027,903
297 4,027,904

CLASS 292

264 4,027,907
4,027,908

CLASS 293

88 4,027,909

CLASS 296

1 C 4,027,910
23 H 4,027,911
23 MC 4,027,912
28 J 4,027,913
78.1 4,027,914

CLASS 297

184 4,027,915
194 4,027,916
284 4,027,888

CLASS 299

2 4,027,917
53 4,027,918

CLASS 301

37 TP 4,027,919

CLASS 302

28 4,027,920
52 4,027,921

CLASS 303

6 C 4,027,923
4,028,658
6 R 4,027,922
92 4,027,924
109 4,027,926

CLASS 305

46 4,027,925

CLASS 307

205 4,028,556
246 4,028,559
247 A 4,028,560
300 4,028,561
303 4,028,562
4,028,563
310 4,028,564
311 4,028,565
326 4,028,594
355 4,028,558
362 4,028,557

CLASS 308

15 4,027,931
72 4,027,927
77 4,027,928
97 4,027,929
202 4,027,930
233 4,027,932
238 4,027,933

CLASS 310

9.5 4,028,566
25 4,028,567
42 4,028,568
64 4,028,569
68 C 4,028,570
89 4,028,571
201 4,028,572
217 4,028,573
269 4,028,574

CLASS 312

321 4,027,934

CLASS 313

105 R 4,028,575
143 4,028,576
221 4,028,578
318 4,028,577
361 4,028,579
406 4,028,580
414 4,028,581
422 4,028,582

CLASS 315

39.69 4,028,583
169 TV 4,028,584
368 4,028,586
371 4,028,585
377 4,028,587
387 4,028,588
408 4,028,589

CLASS 318

87 4,028,597
138 4,028,598
227 4,028,599
4,028,600
271 4,028,601
345 B 4,028,602
587 4,028,603
596 4,028,604
696 4,028,605

CLASS 321

2 4,028,606
5 4,028,607
4,028,609
8 R 4,028,608
14 4,028,610

CLASS 323

8 4,028,611
17 4,028,612
19 4,028,613
75 B 4,028,642
102 4,028,614

CLASS 324

28 RS 4,028,615
29.5 4,028,616
30 R 4,028,618
33 4,028,617
34 PS 4,028,619
51 4,028,620
4,028,621
57 N 4,028,622
142 4,028,623

CLASS 325

23 4,028,624
133 4,028,625
324 4,028,626
349 4,028,627
400 4,028,628

CLASS 330

2 4,028,629
15 4,028,630
19 4,028,631
53 4,028,632
118 4,028,633
151 4,028,634

CLASS 331

94.5 C 4,028,636
94.5 G 4,028,635
107 A 4,028,639
107 R 4,028,637
109 4,028,638
116 R 4,028,640

CLASS 332

18 4,028,641

CLASS 333

6 4,028,643
16 4,028,644
17 M 4,028,645
70 S Re.29,258
72 4,028,646
4,028,647
4,028,648
4,028,649
73 W 4,028,650
4,028,651
4,028,652

CLASS 336

60 4,028,653
92 4,028,654

CLASS 337

160 4,028,655
186 4,028,656

CLASS 338

307 4,028,657

CLASS 339

14 R 4,027,941
48 4,027,935
59 M 4,027,936
66 M 4,027,937
247 4,027,939
272 R 4,027,940

CLASS 340

17 R 4,028,659
18 CM 4,028,660
32 4,028,662
146.3 R 4,028,673
146.3 SY 4,028,674
147 SC 4,028,676
149 A Re.29,259
172.5 4,028,663
4,028,664
4,028,665
4,028,666
4,028,667
4,028,668
4,028,669
4,028,670
4,028,675
4,028,677
4,028,678
4,028,679
4,028,680
4,028,681
4,028,682
4,028,683
4,028,684
173 R 4,028,671
174 TF 4,028,672
4,028,685
195 4,028,686
201 R 4,028,687
227.1 4,028,688
239 R 4,028,689
258 B 4,028,690
280 4,028,691
323 R 4,028,693
324 M 4,028,661
4,028,692
347 AD 4,028,694
365 L 4,028,696
365 R 4,028,695

CLASS 343

5 R 4,028,697
6.5 LC 4,028,698
9 4,028,699
16 R Re.29,260
17.2 PC 4,028,700
18 C 4,028,701
100 SA 4,028,702
105 R 4,028,703
715 4,028,704
4,028,705
4,028,706
719 4,028,707
777 4,028,708
819 4,028,709
854 4,028,710

CLASS 346

153 4,028,711

CLASS 350

10 4,027,942
17 4,027,943
91 4,027,944
96 C 4,027,938
4,027,945
96 WG 4,027,946
144 4,027,947
150 4,027,949
151 4,027,948
160 LC 4,027,950
175 ML 4,027,951
189 4,027,952
288 4,027,953

CLASS 351

17 4,027,954

CLASS 352

72 4,027,955
130 4,027,956

CLASS 353

21 4,027,957
26 A 4,027,958
77 4,027,959

CLASS 354

23 D 4,028,712
106 4,028,713

CLASS 355

3 R 4,027,960
4,027,961
4 4,027,962
8 4,027,963
10 4,027,964
13 4,027,965
16 4,027,966
4,027,967
28 Re.29,254
46 4,027,968
73 4,027,969

CLASS 356

4 4,027,970
36 4,027,971
51 4,027,972
73 4,027,973
74 4,027,974
100 4,027,975
106 R 4,027,976
111 4,027,977
156 4,027,978
180 4,027,979
203 4,027,980
229 4,027,981
237 4,027,982
246 4,027,983

CLASS 357

5 4,028,714
23 4,028,717
24 4,028,715
4,028,716
27 4,028,718
30 4,028,719
4,028,720
31 Re.29,261
38 4,028,721
70 4,028,722
82 4,028,723

CLASS 358

103 4,028,725
106 4,028,728
148 4,028,729
160 4,028,724
165 4,028,726
181 4,028,727
217 4,028,730
260 4,028,731
289 4,028,732

CLASS 360

10 4,028,733
104 4,028,734
106 4,028,735

CLASS 361

11 4,028,591
16 4,028,592
27 4,028,593
29 4,028,736
76 4,028,555
86 4,028,737
220 4,028,590
235 4,028,596
328 4,028,595
403 4,028,738

CLASS 401

28 4,027,984
134 4,027,985
138 4,027,986

CLASS 403

172 4,027,987
218 4,027,988
291 4,027,989
353 4,027,453

CLASS 404

98 4,027,990
112 4,027,991

CLASS 408

97 4,027,992

CLASS 415

1 4,027,993
4,027,994
92 4,027,995
116 4,027,996
207 4,027,997
219 R 4,027,998

CLASS 416

40 4,027,999
107 4,028,000
134 A 4,028,001
4,028,002
141 4,028,003
157 R 4,028,004
186 R 4,028,005
191 4,028,006
212 R 4,028,007

CLASS 417

52 4,028,008
163 4,028,009
217 4,028,010
278 4,028,011
360 4,028,012
390 4,028,013
403 4,028,014
415 4,028,015
440 4,028,016
489 4,028,017
534 4,028,018

CLASS 418

36 4,028,019
51 4,028,020
56 4,028,021
104 4,028,022
108 4,028,023
197 4,028,025
201 4,028,026
4,028,027
219 4,028,028

CLASS 423

24 4,028,462
52 4,028,463

CLASS 424

1 4,028,465
244 4,028,466
4,028,467
273 4,028,464
311 Re.29,256

CLASS 425

23 4,028,029
133.1 4,028,024
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174.8 E 4,028,032
183 4,028,033
302 B 4,028,034
363 4,028,035
374 4,028,036
392 4,028,037
430 4,028,038
436 R 4,028,039
449 4,028,040
459 4,028,041
515 4,028,042

CLASS 426

11 4,028,470
22 4,028,471
436 4,028,468
551 4,028,469

CLASS 427

8 4,028,472
434 E 4,028,473

CLASS 428

40 4,028,474
215 4,028,475
220 4,028,476
285 4,028,477
558 4,028,062
623 4,027,366
652 4,027,367
675 4,028,064

CLASS 429

61 4,028,478
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CLASS 431

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289 4,028,045
297 4,028,046
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CLASS 432

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14 4,028,049
59 4,028,050
144 4,028,051
145 4,028,052

CLASS 526

3 4,028,480
142 4,028,481
271 4,028,482
279 4,028,483
293 4,028,486
335 4,028,484

CLASS 528

486 4,028,485

D1—	15	244,566	D9—	158	244,578		64	244,592		96	244,616			244,608	D34—	5 CB	244,630
D2—	244	244,567		167	244,579		111	244,593	D15—	29	244,597	D24—	17	244,637		5 K	244,628
D4—	35	244,568		189	244,580		147	244,594		199	244,598	D27—	36	244,619			244,629
D6—	67	244,569			244,581			244,595			244,599	D28—	51	244,640		5 L	244,627
	153	244,570		190	244,582			244,596			244,600		64	244,609		15 AE	244,631
	183	244,571		236	244,583	D13—	5	244,618			244,601	D30—	3	244,620		15 GG	244,632
	192	244,572		245	244,584		24	244,612	D16—	24	244,602		6	244,621	D48—	2	244,633
D7—	5	244,573	D10—	64	244,586		28	244,610		65	244,603			244,622		16 B	244,634
D8—	24	244,574		125	244,587			244,611	D19—	73	244,604			244,623	D56—	1 E	244,635
	40	244,575		126	244,588	D14—	43	244,614	D23—	12	244,605			244,624			244,636
	107	244,576	D11—	34	244,589		45	244,613		127	244,606			244,625	D87—	3 F	244,638
	363	244,577			244,590		53	244,617			244,607		32	244,626		5 F	244,639
	367	244,585	D12—	54	244,591		68	244,615									

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

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75—	126 C	T959,002	210—	31 C	T959,004	260—	16	T959,007		829	T959,010	360—	76	T959,012	528—	500	T959,008

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PATENTS

1 : 4,027,948	4,027,643	4,028,342	4,027,406	4,027,652	4,027,785
4,028,087	4,027,647	4,028,403	4,027,414	4,027,668	4,027,821
4,028,107	4,027,651	4,028,411	4,027,473	4,027,673	4,027,842
4 : Re.29,257	4,027,669	4,028,439	4,027,474	4,027,714	4,027,859
4,027,359	4,027,670	4,028,450	4,027,519	4,027,780	4,027,869
4,027,480	4,027,677	4,028,465	4,027,523	4,027,790	4,027,877
4,027,486	4,027,680	4,028,491	4,027,531	4,028,014	4,027,954
4,027,645	4,027,682	4,028,509	4,027,540	4,028,158	4,027,990
4,027,930	4,027,683	4,028,525	4,027,549	4,028,246	4,027,992
4,028,013	4,027,687	4,028,527	4,027,586	4,028,500	4,028,010
4,028,045	4,027,689	4,028,548	4,027,658	4,028,623	4,028,020
4,028,235	4,027,722	4,028,562	4,027,660	4,028,686	4,028,035
4,028,560	4,027,737	4,028,579	4,027,838	4,028,722	4,028,069
4,028,664	4,027,739	4,028,587	4,027,850	13 : 4,027,358	4,028,073
4,028,671	4,027,754	4,028,593	4,027,943	4,027,525	4,028,116
4,028,711	4,027,776	4,028,616	4,027,999	4,027,537	4,028,134
5 : 4,027,464	4,027,779	4,028,626	4,028,003	4,027,747	4,028,166
4,027,742	4,027,798	4,028,636	4,028,007	4,027,789	4,028,191
6 : Re.29,248	4,027,807	4,028,639	4,028,033	4,027,792	4,028,194
Re.29,249	4,027,812	4,028,643	4,028,041	4,028,029	4,028,200
Re.29,254	4,027,834	4,028,651	4,028,167	4,028,141	4,028,212
4,027,339	4,027,835	4,028,659	4,028,197	4,028,159	4,028,216
4,027,357	4,027,841	4,028,675	4,028,227	4,028,162	4,028,223
4,027,373	4,027,870	4,028,685	4,028,274	4,028,358	4,028,251
4,027,374	4,027,872	4,028,701	4,028,324	4,028,487	4,028,253
4,027,380	4,027,878	4,028,702	4,028,360	4,028,498	4,028,264
4,027,396	4,027,885	4,028,708	4,028,361	15 : 4,027,430	4,028,269
4,027,403	4,027,901	4,028,719	4,028,394	17 : Re.29,253	4,028,271
4,027,405	4,027,912	4,028,729	4,028,437	4,027,356	4,028,273
4,027,413	4,027,915	4,028,730	4,028,461	4,027,400	4,028,295
4,027,424	4,027,938	4,028,731	4,028,595	4,027,407	4,028,308
4,027,427	4,027,941	4,028,734	4,028,736	4,027,409	4,028,319
4,027,443	4,027,945	8 : 4,027,502	01 : 4,027,837	4,027,419	4,028,364
4,027,450	4,027,961	4,027,543	10 : 4,027,462	4,027,421	4,028,375
4,027,452	4,027,972	4,027,685	4,027,903	4,027,423	4,028,414
4,027,456	4,027,973	4,027,799	4,028,276	4,027,425	4,028,428
4,027,479	4,027,974	4,027,917	4,028,290	4,027,429	4,028,430
4,027,483	4,027,979	4,028,076	4,028,302	4,027,448	4,028,441
4,027,484	4,027,989	4,028,095	4,028,345	4,027,458	4,028,463
4,027,485	4,027,994	4,028,179	4,028,443	4,027,468	4,028,468
4,027,494	4,028,040	4,028,286	11 : 4,028,540	4,027,471	4,028,515
4,027,499	4,028,066	4,028,522	12 : Re.29,252	4,027,513	4,028,519
4,027,508	4,028,088	4,028,538	4,027,350	4,027,532	4,028,580
4,027,521	4,028,092	4,028,576	4,027,387	4,027,533	4,028,627
4,027,528	4,028,093	4,028,678	4,027,411	4,027,573	4,028,654
4,027,571	4,028,104	4,028,679	4,027,415	4,027,575	4,028,656
4,027,572	4,028,143	4,028,683	4,027,433	4,027,607	4,028,663
4,027,577	4,028,147	4,028,684	4,027,505	4,027,612	4,028,669
4,027,583	4,028,160	9 : Re.29,261	4,027,535	4,027,625	4,028,696
4,027,598	4,028,205	4,027,348	4,027,568	4,027,667	4,028,726
4,027,608	4,028,222	4,027,370	4,027,599	4,027,672	4,028,737
4,027,614	4,028,234	4,027,388	4,027,613	4,027,707	18 : 4,027,439
4,027,620	4,028,240	4,027,390	4,027,615	4,027,782	4,027,481

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1 :	244,621		244,590		244,618		244,628		244,610	42 :	244,576
	244,622		244,591	13 :	244,584		244,629		244,611		244,633
	244,623		244,612	17 :	244,602	27 :	244,598		244,639		244,634
	244,624	8 :	244,626		244,640	32 :	244,605	39 :	244,566	47 :	244,593
	244,625		244,638	19 :	244,575	34 :	244,583		244,570		244,599
6 :	244,568	9 :	244,603	25 :	244,594		244,635		244,573		244,600
	244,577		244,609		244,620		244,636		244,586		244,601
	244,587	12 :	244,567		244,637	36 :	244,578		244,595		244,572
	244,588		244,571	26 :	244,596		244,580		244,615	48 :	244,627
	244,589		244,597		244,616		244,581	41 :	244,614		

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

1 :	T959,001	10 :	T959,004		T959,005	47 :	T959,006		T959,009		
8 :	T959,012	36 :	T959,003	39 :	T959,011		T959,007	48 :	T959,010	51 :	T959,002

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U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, Commissioner